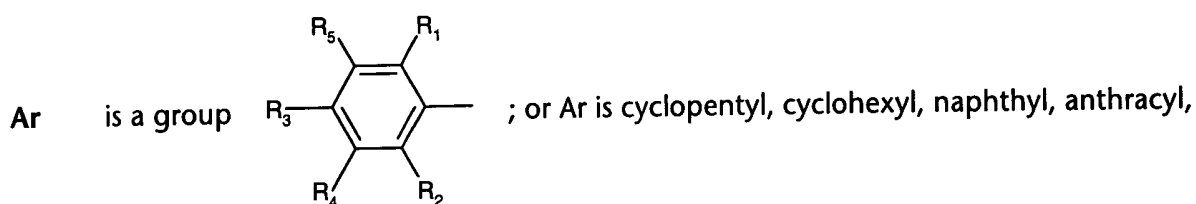
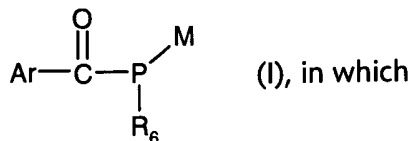


Please amend the above-identified patent application, without prejudice, as follows:

IN THE CLAIMS:

Replace the claims of record with the following:

1. (original) A compound of the formula I



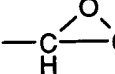
biphenyl or an O-, S- or N-containing 5- or 6-membered heterocyclic ring, where the radicals cyclopentyl, cyclohexyl, naphthyl, anthracyl, biphenyl and 5- or 6-membered heterocyclic ring are unsubstituted or substituted by halogen, C<sub>1</sub>-C<sub>4</sub>alkyl and/or C<sub>1</sub>-C<sub>4</sub>alkoxy;

R<sub>1</sub> and R<sub>2</sub> independently of one another are C<sub>1</sub>-C<sub>20</sub>alkyl, OR<sub>11</sub>, CF<sub>3</sub> or halogen;

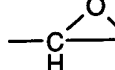
R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> independently of one another are hydrogen, C<sub>1</sub>-C<sub>20</sub>alkyl, OR<sub>11</sub> or halogen;

or in each case two of the radicals R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> together form C<sub>1</sub>-C<sub>20</sub>alkylene, which can be interrupted by O, S or NR<sub>14</sub>;

R<sub>6</sub> is C<sub>1</sub>-C<sub>24</sub>alkyl, unsubstituted or substituted by cycloalkenyl, phenyl, CN, C(O)R<sub>11</sub>, C(O)OR<sub>11</sub>, C(O)N(R<sub>14</sub>)<sub>2</sub>, OC(O)R<sub>11</sub>, OC(O)OR<sub>11</sub>, N(R<sub>14</sub>)C(O)N(R<sub>14</sub>), OC(O)NR<sub>14</sub>, N(R<sub>14</sub>)C(O)OR<sub>11</sub>,

cycloalkyl, halogen, OR<sub>11</sub>, SR<sub>11</sub>, N(R<sub>12</sub>)(R<sub>13</sub>) or ;

C<sub>2</sub>-C<sub>24</sub>alkyl which is interrupted once or more than once by nonconsecutive O, S or NR<sub>14</sub> and which is unsubstituted or substituted by phenyl, OR<sub>11</sub>, SR<sub>11</sub>, N(R<sub>12</sub>)(R<sub>13</sub>), CN, C(O)R<sub>11</sub>, C(O)OR<sub>11</sub>,

C(O)N(R<sub>14</sub>)<sub>2</sub> and/or .

C<sub>2</sub>-C<sub>24</sub>alkenyl which is uninterrupted or interrupted once or more than once by nonconsecutive O, S or NR<sub>14</sub> and which is unsubstituted or substituted by OR<sub>11</sub>, SR<sub>11</sub> or N(R<sub>12</sub>)(R<sub>13</sub>);

$C_5-C_{24}$ cycloalkenyl which is uninterrupted or interrupted once or more than once by non-consecutive O, S or  $NR_{14}$  and which is unsubstituted or substituted by  $OR_{11}$ ,  $SR_{11}$  or  $N(R_{12})(R_{13})$ ;

$C_7-C_{24}$ arylalkyl which is unsubstituted or substituted on the aryl group by  $C_1-C_{12}$ alkyl,

$C_1-C_{12}$ alkoxy or halogen;

$C_4-C_{24}$ cycloalkyl which is uninterrupted or interrupted once or more than once by O, S and/or  $NR_{14}$  and which is unsubstituted or substituted by  $OR_{11}$ ,  $SR_{11}$  or  $N(R_{12})(R_{13})$ ;

or  $C_8-C_{24}$ arylcycloalkyl or  $C_8-C_{24}$ arylcycloalkenyl;

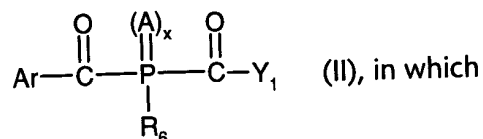
$R_{11}$  is H,  $C_1-C_{20}$ alkyl,  $C_2-C_{20}$ alkenyl,  $C_3-C_8$ cycloalkyl, phenyl, benzyl or  $C_2-C_{20}$ alkyl, which is interrupted once or more than once by O or S and which is unsubstituted or is substituted by OH and/or SH;

$R_{12}$  and  $R_{13}$  independently of one another are hydrogen,  $C_1-C_{20}$ alkyl,  $C_3-C_8$ cycloalkyl, phenyl, benzyl or  $C_2-C_{20}$ alkyl which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted by OH and/or SH; or  $R_{12}$  and  $R_{13}$  together are  $C_3-C_5$ alkylene which is uninterrupted or interrupted by O, S or  $NR_{14}$ ;

$R_{14}$  is hydrogen, phenyl,  $C_1-C_{12}$ alkyl or  $C_2-C_{12}$ alkyl which is interrupted once or more than once by O or S and which is unsubstituted or substituted by OH and/or SH; and

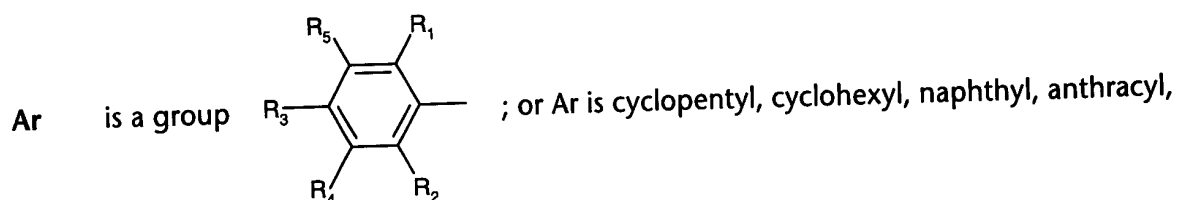
M is hydrogen, Li, Na or K.

2. (previously amended) A compound of the formula II



A is O or S;

x is 0 or 1;



biphenyl or an O-, S- or N-containing 5- or 6-membered heterocyclic ring, where the radicals

cyclopentyl, cyclohexyl, naphthyl, anthracyl, biphenyl and 5- or 6-membered heterocyclic ring are unsubstituted or substituted by halogen, C<sub>1</sub>-C<sub>4</sub>alkyl and/or C<sub>1</sub>-C<sub>4</sub>alkoxy;

R<sub>1</sub> and R<sub>2</sub> independently of one another are C<sub>1</sub>-C<sub>20</sub>alkyl, OR<sub>11</sub>, CF<sub>3</sub> or halogen;

R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> independently of one another are hydrogen, C<sub>1</sub>-C<sub>20</sub>alkyl, OR<sub>11</sub> or halogen;

or in each case two of the radicals R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> together form C<sub>1</sub>-C<sub>20</sub>alkylene which can be interrupted by O, S or -NR<sub>14</sub>;

R<sub>6</sub> is C<sub>1</sub>-C<sub>24</sub>alkyl, unsubstituted or substituted by C<sub>5</sub>-C<sub>24</sub>cycloalkenyl, phenyl, CN, C(O)R<sub>11</sub>, C(O)OR<sub>11</sub>, C(O)N(R<sub>14</sub>)<sub>2</sub>, OC(O)R<sub>11</sub>, OC(O)OR<sub>11</sub>, N(R<sub>14</sub>)C(O)N(R<sub>14</sub>), OC(O)NR<sub>14</sub>, N(R<sub>14</sub>)C(O)OR<sub>11</sub>,

cycloalkyl, halogen, OR<sub>11</sub>, SR<sub>11</sub>, N(R<sub>12</sub>)(R<sub>13</sub>) or  $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$ ;

C<sub>2</sub>-C<sub>24</sub>alkyl which is interrupted once or more than once by nonconsecutive O, S or NR<sub>14</sub> and which is unsubstituted or substituted by phenyl, OR<sub>11</sub>, SR<sub>11</sub>, N(R<sub>12</sub>)(R<sub>13</sub>), CN, C(O)R<sub>11</sub>, C(O)OR<sub>11</sub>,

C(O)N(R<sub>14</sub>)<sub>2</sub> and/or  $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$ ;

C<sub>2</sub>-C<sub>24</sub>alkenyl which is uninterrupted or interrupted once or more than once by nonconsecutive O, S or NR<sub>14</sub> and which is unsubstituted or substituted by OR<sub>11</sub>, SR<sub>11</sub> or N(R<sub>12</sub>)(R<sub>13</sub>);

C<sub>5</sub>-C<sub>24</sub>cycloalkenyl which is uninterrupted or interrupted once or more than once by nonconsecutive O, S or NR<sub>14</sub> and which is unsubstituted or substituted by OR<sub>11</sub>, SR<sub>11</sub> or N(R<sub>12</sub>)(R<sub>13</sub>);

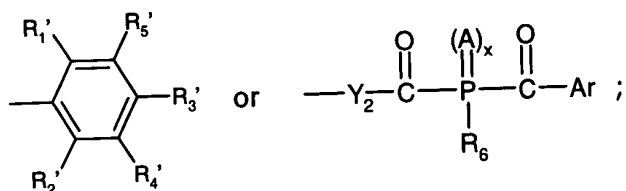
C<sub>7</sub>-C<sub>24</sub>arylalkyl which is unsubstituted or substituted on the aryl group by C<sub>1</sub>-C<sub>12</sub>alkyl, C<sub>1</sub>-C<sub>12</sub>alkoxy or halogen;

C<sub>4</sub>-C<sub>24</sub>cycloalkyl which is uninterrupted or interrupted once or more than once by O, S and/or NR<sub>14</sub> and which is unsubstituted or substituted by OR<sub>11</sub>, SR<sub>11</sub> or N(R<sub>12</sub>)(R<sub>13</sub>); or C<sub>8</sub>-C<sub>24</sub>arylalkyl or C<sub>8</sub>-C<sub>24</sub>arylalkenyl;

R<sub>11</sub> is H, C<sub>1</sub>-C<sub>20</sub>alkyl, C<sub>2</sub>-C<sub>20</sub>alkenyl, C<sub>3</sub>-C<sub>8</sub>cycloalkyl, phenyl, benzyl or C<sub>2</sub>-C<sub>20</sub>alkyl which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted by OH and/or SH;

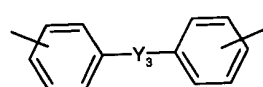
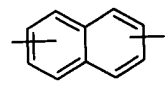
R<sub>12</sub> and R<sub>13</sub> independently of one another are hydrogen, C<sub>1</sub>-C<sub>20</sub>alkyl, C<sub>3</sub>-C<sub>8</sub>cycloalkyl, phenyl, benzyl or C<sub>2</sub>-C<sub>20</sub>alkyl which is interrupted once or more than once by O or S and which is unsubstituted or substituted by OH and/or SH; or R<sub>12</sub> and R<sub>13</sub> together are C<sub>3</sub>-C<sub>5</sub>alkylene which is uninterrupted or interrupted by O, S or NR<sub>14</sub>;

$Y_1$  is  $C_1$ - $C_{18}$ alkyl which is unsubstituted or substituted by one or more phenyl;  $C_1$ - $C_{18}$ -halogenoalkyl;  $C_2$ - $C_{18}$ alkyl which is interrupted once or more than once by O or S and which can be substituted by OH and/or SH; unsubstituted  $C_3$ - $C_{18}$ cycloalkyl or  $C_3$ - $C_{18}$ cycloalkyl substituted by  $C_1$ - $C_{20}$ alkyl,  $OR_{11}$ ,  $CF_3$  or halogen;  $C_2$ - $C_{18}$ alkenyl; or  $Y_1$  is  $OR_{11}$ ,  $N(R_{12})(R_{13})$  or one of the radicals



or  $Y_1$  is cyclopentyl, cyclohexyl, naphthyl, anthracyl, biphenyl or an O-, S- or N-containing 5- or 6-membered heterocyclic ring, where the radicals cyclopentyl, cyclohexyl, naphthyl, anthracyl, biphenyl and 5- or 6-membered heterocyclic ring are unsubstituted or substituted by halogen,  $C_1$ - $C_4$ alkyl and/or  $C_1$ - $C_4$ alkoxy;

$Y_2$  is a direct bond; unsubstituted or phenyl-substituted  $C_1$ - $C_{18}$ alkylene; unsubstituted  $C_4$ - $C_{18}$ -cycloalkylene or  $C_4$ - $C_{18}$ cycloalkylene substituted by  $C_1$ - $C_{12}$ alkyl,  $OR_{11}$ , halogen and/or phenyl; unsubstituted  $C_5$ - $C_{18}$ cycloalkenylene or  $C_5$ - $C_{18}$ cycloalkenylene substituted by  $C_1$ - $C_{12}$ alkyl,  $OR_{11}$ , halogen and/or phenyl; unsubstituted phenylene or phenylene substituted one to four times by  $C_1$ - $C_{12}$ alkyl,  $OR_{11}$ , halogen,  $-(CO)OR_{14}$ ,  $-(CO)N(R_{12})(R_{13})$  and/or phenyl;

or  $Y_2$  is a radical  or , where these radicals are

unsubstituted or are substituted one to four times on one or both aromatic ring(s) by

$C_1$ - $C_{12}$ alkyl,  $OR_{11}$ , halogen and/or phenyl;

$Y_3$  is O, S, SO,  $SO_2$ ,  $CH_2$ ,  $C(CH_3)_2$ ,  $CHCH_3$ ,  $C(CF_3)_2$ , CO or a direct bond;

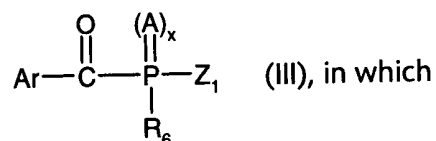
$R_{14}$  is hydrogen, phenyl,  $C_1$ - $C_{12}$ alkyl or  $C_2$ - $C_{12}$ alkyl which is interrupted once or more than once by O or S and which can be substituted by OH and/or SH;

$R_1'$  and  $R_2'$  independently of one another have the same meanings as given for  $R_1$  and  $R_2$ ; and  $R_3'$ ,  $R_4'$  and  $R_5'$  independently of one another have the same meanings as given for  $R_3$ ,  $R_4$  and  $R_5$ ;

or in each case two of the radicals  $R_1'$ ,  $R_2'$ ,  $R_3'$ ,  $R_4'$  and  $R_5'$  together form  $C_1$ - $C_{20}$ alkylene which may be interrupted by O, S or  $-NR_{14}$ ;

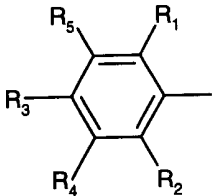
with the proviso that  $Y_1$  is not identical to Ar and wherein the compounds n-butyl-(2,6-dimethoxybenzoyl)-(2,4,6-trimethylbenzoyl) phosphine oxide, i-butyl-(2,6-dimethoxybenzoyl)-(2,4,6-trimethylbenzoyl) phosphine oxide and (2,6-dimethoxybenzoyl)-(2,6-dimethylbenzoyl)-(2,4,4-trimethylpentyl) phosphine oxide are excluded.

3. (previously amended) A compound of the formula III



A is O or S;

x is 0 or 1;

Ar is a group ; or Ar is cyclopentyl, cyclohexyl, naphthyl, anthracyl,

biphenyl or an O-, S- or N-containing 5- or 6-membered heterocyclic ring, where the radicals cyclopentyl, cyclohexyl, naphthyl, anthracyl, biphenyl and 5- or 6-membered heterocyclic ring are unsubstituted or substituted by halogen,  $\text{C}_1\text{-C}_4$ alkyl and/or  $\text{C}_1\text{-C}_4$ alkoxy;

$\text{R}_1$  and  $\text{R}_2$  independently of one another are  $\text{C}_1\text{-C}_{20}$ alkyl,  $\text{OR}_{11}$ ,  $\text{CF}_3$  or halogen;

$\text{R}_3$ ,  $\text{R}_4$  and  $\text{R}_5$  independently of one another are hydrogen,  $\text{C}_1\text{-C}_{20}$ alkyl,  $\text{OR}_{11}$  or halogen;

or in each case two of the radicals  $\text{R}_1$ ,  $\text{R}_2$ ,  $\text{R}_3$ ,  $\text{R}_4$  and  $\text{R}_5$  together form  $\text{C}_1\text{-C}_{20}$ alkylene which can be interrupted by O, S or  $\text{-NR}_{14}$ ;

$\text{R}_6$  is  $\text{C}_1\text{-C}_{24}$ alkyl, unsubstituted or substituted by  $\text{C}_5\text{-C}_{24}$ cycloalkenyl, phenyl, CN,  $\text{C(O)R}_{11}$ ,  $\text{C(O)OR}_{11}$ ,  $\text{C(O)N(R}_{14})_2$ ,  $\text{OC(O)R}_{11}$ ,  $\text{OC(O)OR}_{11}$ ,  $\text{N(R}_{14})\text{C(O)N(R}_{14})}$ ,  $\text{OC(O)NR}_{14}$ ,  $\text{N(R}_{14})\text{C(O)OR}_{11}$ ,

cycloalkyl, halogen,  $\text{OR}_{11}$ ,  $\text{SR}_{11}$ ,  $\text{N(R}_{12})(\text{R}_{13})$  or  $\text{—}\overset{\text{O}}{\text{C}}\text{—CH}_2$ ;

$\text{C}_2\text{-C}_{24}$ alkyl which is interrupted once or more than once by nonconsecutive O, S or  $\text{NR}_{14}$  and which is unsubstituted or substituted by phenyl,  $\text{OR}_{11}$ ,  $\text{SR}_{11}$ ,  $\text{N(R}_{12})(\text{R}_{13})$ , CN,  $\text{C(O)R}_{11}$ ,  $\text{C(O)OR}_{11}$ ,

$\text{C(O)N(R}_{14})_2$  and/or  $\text{—}\overset{\text{O}}{\text{C}}\text{—CH}_2$ ;

C<sub>2</sub>-C<sub>24</sub>alkenyl which is uninterrupted or interrupted once or more than once by nonconsecutive O, S or NR<sub>14</sub> and which is unsubstituted or substituted by OR<sub>11</sub>, SR<sub>11</sub> or N(R<sub>12</sub>)(R<sub>13</sub>);

C<sub>5</sub>-C<sub>24</sub>cycloalkenyl which is uninterrupted or interrupted once or more than once by nonconsecutive O, S or NR<sub>14</sub> and which is unsubstituted or substituted by OR<sub>11</sub>, SR<sub>11</sub> or N(R<sub>12</sub>)(R<sub>13</sub>);

C<sub>7</sub>-C<sub>24</sub>arylalkyl which is unsubstituted or substituted on the aryl group by C<sub>1</sub>-C<sub>12</sub>alkyl, C<sub>1</sub>-C<sub>12</sub>alkoxy or halogen;

C<sub>4</sub>-C<sub>24</sub>cycloalkyl which is uninterrupted or interrupted once or more than once by O, S and/or NR<sub>14</sub> and which is unsubstituted or substituted by OR<sub>11</sub>, SR<sub>11</sub> or N(R<sub>12</sub>)(R<sub>13</sub>); or C<sub>8</sub>-C<sub>24</sub>arylalkyl or C<sub>8</sub>-C<sub>24</sub>arylalkenyl;

R<sub>11</sub> is H, C<sub>1</sub>-C<sub>20</sub>alkyl, C<sub>2</sub>-C<sub>20</sub>alkenyl, C<sub>3</sub>-C<sub>8</sub>cycloalkyl, phenyl, benzyl or C<sub>2</sub>-C<sub>20</sub>alkyl which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted by OH and/or SH;

R<sub>12</sub> and R<sub>13</sub> independently of one another are hydrogen, C<sub>1</sub>-C<sub>20</sub>alkyl, C<sub>3</sub>-C<sub>8</sub>cycloalkyl, phenyl, benzyl or C<sub>2</sub>-C<sub>20</sub>alkyl, which is interrupted once or more than once by O or S and which is unsubstituted or substituted by OH and/or SH; or R<sub>12</sub> and R<sub>13</sub> together are C<sub>3</sub>-C<sub>5</sub>alkylene which is uninterrupted or interrupted by O, S or NR<sub>14</sub>;

Z<sub>1</sub> is C<sub>1</sub>-C<sub>24</sub>alkyl, which is unsubstituted or substituted once or more than once by OR<sub>15</sub>, SR<sub>15</sub>,

N(R<sub>16</sub>)(R<sub>17</sub>), phenyl, halogen, CN, -N=C=A,  $\begin{array}{c} \text{O} \\ \diagup \quad \diagdown \\ \text{---C---CH}_2 \\ | \\ \text{H} \end{array}$ ,  $\begin{array}{c} \text{A} \\ || \\ \text{---C---R}_{18} \end{array}$ ,  $\begin{array}{c} \text{A} \\ || \\ \text{---C---OR}_{18} \end{array}$

and/or  $\begin{array}{c} \text{A}_1 \\ || \\ \text{---C---N(R}_{18})_2 \end{array}$  or Z<sub>1</sub> is C<sub>2</sub>-C<sub>24</sub>alkyl which is interrupted once or more than once by O, S

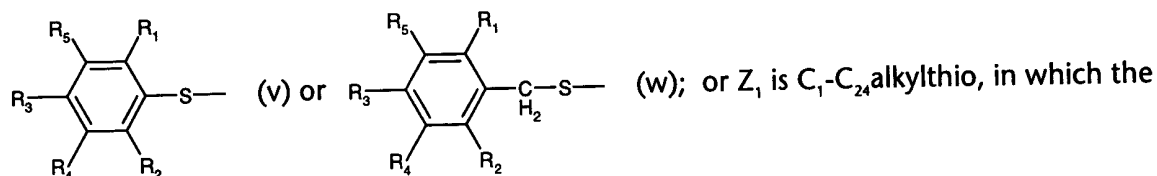
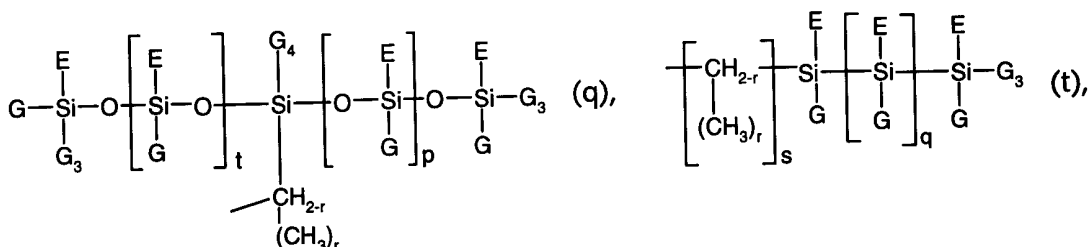
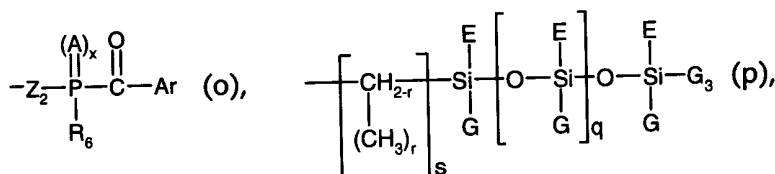
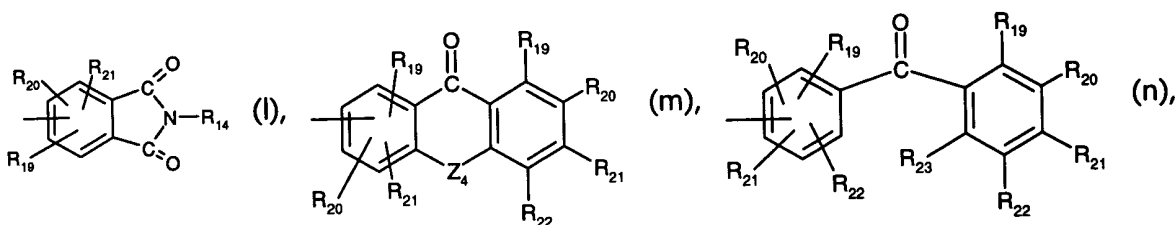
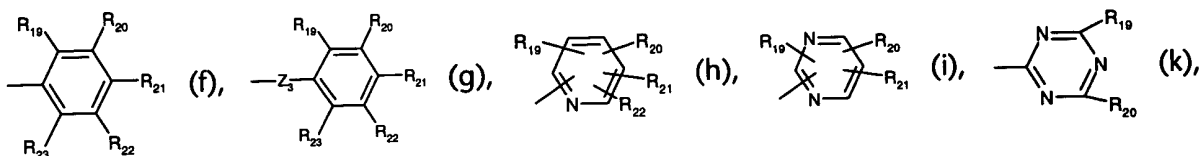
or NR<sub>14</sub> and which can be substituted by OR<sub>15</sub>, SR<sub>15</sub>, N(R<sub>16</sub>)(R<sub>17</sub>), phenyl, halogen,  $\begin{array}{c} \text{O} \\ \diagup \quad \diagdown \\ \text{---C---CH}_2 \\ | \\ \text{H} \end{array}$ ,

$\begin{array}{c} \text{A} \\ || \\ \text{---C---R}_{18} \end{array}$ ,  $\begin{array}{c} \text{A} \\ || \\ \text{---C---OR}_{18} \end{array}$  and/or  $\begin{array}{c} \text{A}_1 \\ || \\ \text{---C---N(R}_{18})_2 \end{array}$ ; or Z<sub>1</sub> is C<sub>1</sub>-C<sub>24</sub>alkoxy, which is substituted

once or more than once by phenyl, CN, -N=C=A,  $\begin{array}{c} \text{O} \\ \diagup \quad \diagdown \\ \text{---C---CH}_2 \\ | \\ \text{H} \end{array}$ ,  $\begin{array}{c} \text{A} \\ || \\ \text{---C---R}_{18} \end{array}$ ,  $\begin{array}{c} \text{A} \\ || \\ \text{---C---OR}_{18} \end{array}$

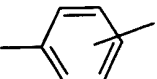
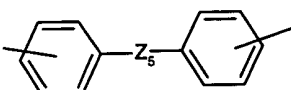
and/or  $\begin{array}{c} \text{A}_1 \\ || \\ \text{---C---N(R}_{18})_2 \end{array}$ ; or Z<sub>1</sub> is  $\begin{array}{c} \text{A} \\ || \\ \text{---C---OR}_{11} \end{array}$ ,  $\begin{array}{c} \text{A}_1 \\ || \\ \text{---C---N(R}_{16})_2 \end{array}$ ,  $\begin{array}{c} \text{A} \\ || \\ \text{---C---OR}_{11a} \end{array}$  or

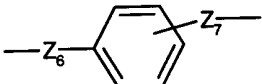
$\text{---}\overset{\overset{\text{A}_1}{\parallel}}{\text{C}}\text{---}\text{N}(\text{R}_{18a})(\text{R}_{18b})$ ; or  $\text{Z}_1$  is unsubstituted  $\text{C}_3\text{--C}_{24}$ cycloalkyl or  $\text{C}_3\text{--C}_{24}$ cycloalkyl substituted by  $\text{C}_1\text{--C}_{20}$ alkyl,  $\text{OR}_{11}$ ,  $\text{CF}_3$  or halogen; unsubstituted  $\text{C}_2\text{--C}_{24}$ alkenyl or  $\text{C}_2\text{--C}_{24}$ alkenyl substituted by  $\text{C}_6\text{--C}_{12}$ aryl,  $\text{CN}$ ,  $(\text{CO})\text{OR}_{15}$  or  $(\text{CO})\text{N}(\text{R}_{18})_2$ ; or  $\text{Z}_1$  is  $\text{C}_3\text{--C}_{24}$ cycloalkenyl or is one of the radicals



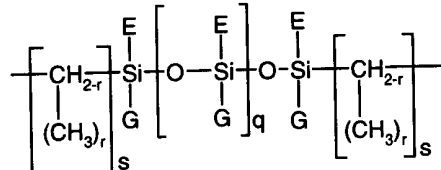
alkyl radical is uninterrupted or interrupted once or more than once by nonconsecutive O or S, and is unsubstituted or substituted by  $\text{OR}_{15}$ ,  $\text{SR}_{15}$  and/or halogen; with the proviso that  $\text{Z}_1$  and  $\text{R}_6$  are not identical;  $\text{A}_1$  is O, S or  $\text{NR}_{18a}$ ;

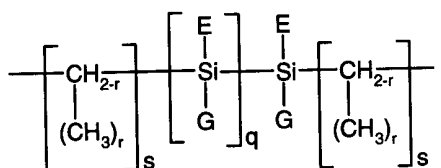
$Z_2$  is  $C_1$ - $C_{24}$ alkylene;  $C_2$ - $C_{24}$ alkylene interrupted once or more than once by O, S or  $NR_{14}$ ;  $C_2$ - $C_{24}$ alkenylene;  $C_2$ - $C_{24}$ alkenylene interrupted once or more than once by O, S or  $NR_{14}$ ;  $C_3$ - $C_{24}$ cycloalkylene;  $C_3$ - $C_{24}$ cycloalkylene interrupted once or more than once by O, S or  $NR_{14}$ ;  $C_3$ - $C_{24}$ cycloalkylene;  $C_3$ - $C_{24}$ cycloalkenylene interrupted once or more than once by O, S or  $NR_{14}$ ; where the radicals  $C_1$ - $C_{24}$ alkylene,  $C_2$ - $C_{24}$ alkylene,  $C_2$ - $C_{24}$ alkenylene,  $C_3$ - $C_{24}$ cycloalkylene and  $C_3$ - $C_{24}$ cycloalkenylene are unsubstituted or are substituted by  $OR_{11}$ ,  $SR_{11}$ ,  $N(R_{12})(R_{13})$  and/or

halogen; or  $Z_2$  is one of the radicals  , 

or  , where these radicals are unsubstituted or are substituted on the

aromatic by  $C_1$ - $C_{20}$ alkyl;  $C_2$ - $C_{20}$ alkyl which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted by OH and/or SH;  $OR_{11}$ ,  $SR_{11}$ ,  $N(R_{12})(R_{13})$ , phenyl, halogen,  $NO_2$ , CN,  $(CO)-OR_{11}$ ,  $(CO)-R_{11}$ ,  $(CO)-N(R_{12})(R_{13})$ ,  $SO_2R_{24}$ ,  $OSO_2R_{24}$ ,  $CF_3$  and/or  $CCl_3$ ;

or  $Z_2$  is a group  (r) or

 (u);

$Z_3$  is  $CH_2$ ,  $CH(OH)$ ,  $CH(CH_3)$  or  $C(CH_3)_2$ ;

$Z_4$  is S, O,  $CH_2$ , C=O,  $NR_{14}$  or a direct bond;

$Z_5$  is S, O,  $CH_2$ ,  $CHCH_3$ ,  $C(CH_3)_2$ ,  $C(CF_3)_2$ , SO,  $SO_2$ , CO;

$Z_6$  and  $Z_7$  independently of one another are  $CH_2$ ,  $CHCH_3$  or  $C(CH_3)_2$ ;

r is 0, 1 or 2;

s is a number from 1 to 12;



q is a number from 0 to 50;

t and p are each a number from 0 to 20;

E, G, G<sub>3</sub> and G<sub>4</sub> independently of one another are unsubstituted C<sub>1</sub>-C<sub>12</sub>alkyl or C<sub>1</sub>-C<sub>12</sub>alkyl substituted by halogen, or are unsubstituted phenyl or phenyl substituted by one or more C<sub>1</sub>-C<sub>4</sub>alkyl; or are C<sub>2</sub>-C<sub>12</sub>alkenyl;

R<sub>11a</sub> is C<sub>1</sub>-C<sub>20</sub>alkyl substituted once or more than once by OR<sub>15</sub> or  $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$ ; or is C<sub>2</sub>-C<sub>20</sub>alkyl

which is interrupted once or more than once by nonconsecutive O atoms and is unsubstituted

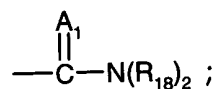
or substituted once or more than once by OR<sub>15</sub>, halogen or  $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$ ; or R<sub>11a</sub> is C<sub>2</sub>-C<sub>20</sub>alkenyl,

C<sub>3</sub>-C<sub>12</sub>alkynyl; or R<sub>11a</sub> is C<sub>3</sub>-C<sub>12</sub>cycloalkenyl which is substituted once or more than once by

halogen, NO<sub>2</sub>, C<sub>1</sub>-C<sub>6</sub>alkyl, OR<sub>11</sub> or C(O)OR<sub>18</sub>; or C<sub>7</sub>-C<sub>16</sub>arylalkyl or C<sub>8</sub>-C<sub>16</sub>aryl(cyclo)alkyl;

R<sub>14</sub> is hydrogen, phenyl, C<sub>1</sub>-C<sub>12</sub>alkoxy, C<sub>1</sub>-C<sub>12</sub>alkyl or C<sub>2</sub>-C<sub>12</sub>alkyl which is interrupted once or more than once by O or S and which is unsubstituted or substituted by OH and/or SH;

R<sub>15</sub> has one of the meanings given for R<sub>11</sub> or is a radical  $\text{---}\overset{\text{A}}{\underset{\text{H}}{\text{C}}}\text{---R}_{18}$ ,  $\text{---}\overset{\text{A}}{\underset{\text{H}}{\text{C}}}\text{---OR}_{18}$  or



R<sub>16</sub> and R<sub>17</sub> independently of one another have one of the meanings given for R<sub>12</sub> or are a

radical  $\text{---}\overset{\text{A}}{\underset{\text{H}}{\text{C}}}\text{---R}_{18}$ ,  $\text{---}\overset{\text{A}}{\underset{\text{H}}{\text{C}}}\text{---OR}_{18}$  or  $\text{---}\overset{\text{A}_1}{\underset{\text{H}}{\text{C}}}\text{---N(R}_{18})_2$ ;

R<sub>18</sub> is hydrogen, C<sub>1</sub>-C<sub>24</sub>alkyl, C<sub>2</sub>-C<sub>12</sub>alkenyl, C<sub>3</sub>-C<sub>8</sub>cycloalkyl, phenyl, benzyl; C<sub>2</sub>-C<sub>20</sub>alkyl which is interrupted once or more than once by O or S and which is unsubstituted or substituted by OH;

R<sub>18a</sub> and R<sub>18b</sub> independently of one another are hydrogen; C<sub>1</sub>-C<sub>20</sub>alkyl, which is substituted once

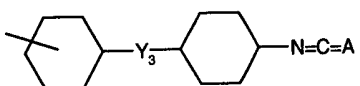
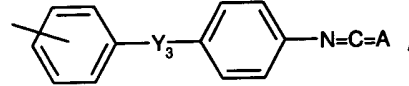
or more than once by OR<sub>15</sub>, halogen, styryl, methylstyryl, -N=C=A or  $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$ ; or C<sub>2</sub>-C<sub>20</sub>alkyl,

which is interrupted once or more than once by nonconsecutive O atoms and which is

unsubstituted or substituted once or more than once by OR<sub>15</sub>, halogen, styryl, methylstyryl or

$-\overset{\text{O}}{\underset{\text{H}}{\text{C}}}-\text{CH}_2$ ; or  $\text{R}_{18a}$  and  $\text{R}_{18b}$  are  $\text{C}_2$ - $\text{C}_{12}$ alkenyl;  $\text{C}_5$ - $\text{C}_{12}$ cycloalkyl, which is substituted by  $-\text{N}=\text{C}=\text{A}$  or

$-\text{CH}_2-\text{N}=\text{C}=\text{A}$  and is additionally unsubstituted or substituted by one or more  $\text{C}_1$ - $\text{C}_4$ alkyl; or  $\text{R}_{18a}$  and  $\text{R}_{18b}$  are  $\text{C}_6$ - $\text{C}_{12}$ aryl, unsubstituted or substituted once or more than once by halogen,  $\text{NO}_2$ ,  $\text{C}_1$ - $\text{C}_6$ alkyl,  $\text{C}_2$ - $\text{C}_4$ alkenyl,  $\text{OR}_{11}$ ,  $-\text{N}=\text{C}=\text{A}$ ,  $-\text{CH}_2-\text{N}=\text{C}=\text{A}$  or  $\text{C}(\text{O})\text{OR}_{18}$ ; or  $\text{R}_{18a}$  and  $\text{R}_{18b}$  are  $\text{C}_7$ - $\text{C}_{16}$ arylalkyl; or  $\text{R}_{18a}$  and  $\text{R}_{18b}$  together are  $\text{C}_8$ - $\text{C}_{16}$ arylalkyl; or  $\text{R}_{18a}$  and  $\text{R}_{18b}$  independently of

one another are  or  ;

$\text{Y}_3$  is O, S, SO,  $\text{SO}_2$ ,  $\text{CH}_2$ ,  $\text{C}(\text{CH}_3)_2$ ,  $\text{CHCH}_3$ ,  $\text{C}(\text{CF}_3)_2$ , (CO), or a direct bond;

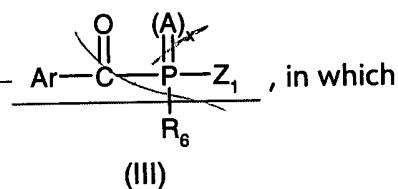
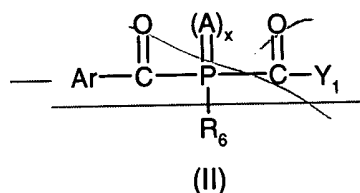
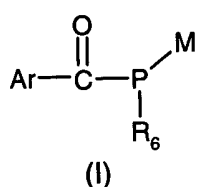
$\text{R}_{19}$ ,  $\text{R}_{20}$ ,  $\text{R}_{21}$ ,  $\text{R}_{22}$  and  $\text{R}_{23}$  independently of one another are hydrogen,  $\text{C}_1$ - $\text{C}_{20}$ alkyl;  $\text{C}_2$ - $\text{C}_{20}$ alkyl, which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted by OH and/or SH; or  $\text{R}_{19}$ ,  $\text{R}_{20}$ ,  $\text{R}_{21}$ ,  $\text{R}_{22}$  and  $\text{R}_{23}$  are  $\text{OR}_{11}$ ,  $\text{SR}_{11}$ ,  $\text{N}(\text{R}_{12})(\text{R}_{13})$ ,  $\text{NO}_2$ , CN,  $\text{SO}_2\text{R}_{24}$ ,  $\text{OSO}_2\text{R}_{24}$ ,  $\text{CF}_3$ ,  $\text{CCl}_3$ , halogen; or phenyl which is unsubstituted or substituted once or more than once by  $\text{C}_1$ - $\text{C}_4$ alkyl or  $\text{C}_1$ - $\text{C}_4$ alkoxy;

or in each case two of the radicals  $\text{R}_{19}$ ,  $\text{R}_{20}$ ,  $\text{R}_{21}$ ,  $\text{R}_{22}$  and  $\text{R}_{23}$  together form  $\text{C}_1$ - $\text{C}_{20}$ alkylene which is uninterrupted or interrupted by O, S or  $-\text{NR}_{14}$ ;

$\text{R}_{24}$  is  $\text{C}_1$ - $\text{C}_{12}$ alkyl, halogen-substituted  $\text{C}_1$ - $\text{C}_{12}$ alkyl, phenyl, or phenyl substituted by  $\text{OR}_{11}$  and/or  $\text{SR}_{11}$ ;

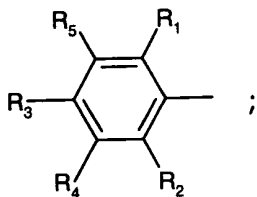
with the proviso that  $\text{R}_6$  and  $\text{Z}_1$  are not identical and wherein the compounds benzyl-n-butyl-(2,6-dimethoxybenzoyl) phosphine oxide and benzyl-n-butyl-(2,4,6-trimethylbenzoyl) phosphine oxide are excluded.

4. (currently amended) 4. A compound of the formula I, II or III



, in which

Ar is a group



$R_1$  and  $R_2$  independently of one another are  $C_1$ - $C_8$ alkyl or  $OR_{11}$ ;

$R_3$ ,  $R_4$  and  $R_5$  independently of one another are hydrogen or  $C_1$ - $C_8$ alkyl;

$R_6$  is  $C_1$ - $C_{12}$ alkyl;

$R_{11}$  is H or  $C_1$ - $C_8$ alkyl;

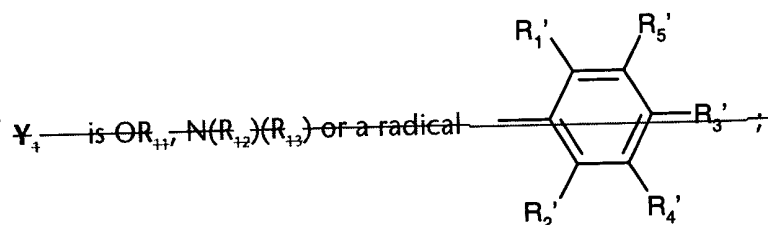
$R_{12}$  and  $R_{13}$  independently of one another are hydrogen or  $C_1$ - $C_8$ alkyl;

M is hydrogen or Li;

A is O;

x is 1;

C1



$R'_1$  and  $R'_2$  independently of one another have the same meanings given for  $R_1$  and  $R_2$ ; and

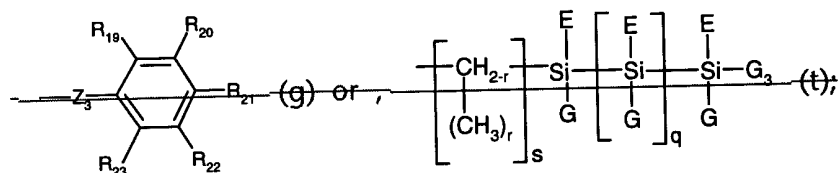
$R'_3$ ,  $R'_4$  and  $R'_5$  independently of one another have the same meanings as given for  $R_3$ ,  $R_4$  and

$R_5$ ;

with the proviso that  $Y_1$  is not identical to Ar;

$Z_1$  is  $C_1$ - $C_{12}$ alkyl which is unsubstituted or substituted once or more than once by  $OR_{15}$ ;

phenyl and/or  $\text{---}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{---}OR_{18}$ ; or  $Z_1$  is unsubstituted or  $OR_{11}$ -substituted  $C_3$ - $C_{24}$ cycloalkyl; or  $Z_1$  is one of the radicals



$Z_3$  is  $CH_2$  or  $CH(OH)$ ;

~~r is 0;~~

~~s is 1;~~

~~E, G and G<sub>3</sub> independently of one another are unsubstituted C<sub>1</sub>-C<sub>4</sub> alkyl;~~

~~R<sub>15</sub> has one of the meanings given for R<sub>11</sub>;~~

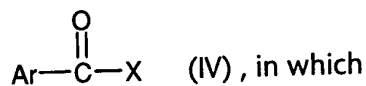
~~R<sub>18</sub> is C<sub>1</sub>-C<sub>12</sub> alkyl; and~~

~~R<sub>19</sub>, R<sub>20</sub>, R<sub>21</sub>, R<sub>22</sub> and R<sub>23</sub> independently of one another are hydrogen or halogen;~~

~~and with the proviso that R<sub>6</sub> and Z<sub>1</sub> are not identical.~~

5. (original) A process for the selective preparation of compounds of the formula I according to claim 1, by

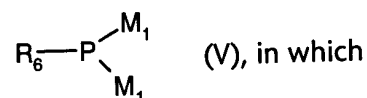
(1) reaction of an acyl halide of the formula IV



Ar is as defined in claim 1, and

X is Cl or Br;

with a dimetalated organophosphine of the formula V



R<sub>6</sub> is as defined in claim 1; and

M<sub>1</sub> is Na, Li or K;

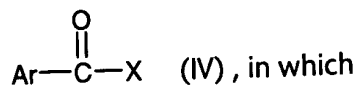
in the molar ratio 1:1; and

(2) where appropriate, subsequent hydrolysis if compounds of the formula I in which M is hydrogen are to be obtained.

6. Cancel

7. (original) A process for the preparation of compounds of the formula II according to claim 2 by

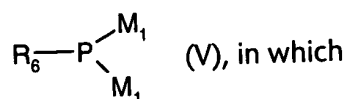
(1) reaction of an acyl halide of the formula IV



Ar is as defined in claim 2, and

X is Cl or Br;

with a dimetalated organophosphine of the formula V

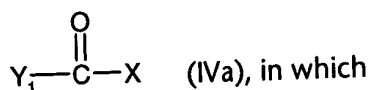


R<sub>6</sub> is as defined in claim 2; and

M<sub>1</sub> is Na, Li or K;

in the molar ratio of approximately 1:1;

(2) subsequent reaction of the product with an acyl halide of the formula IVa



Y<sub>1</sub> is as defined in claim 2; and

X is as defined above;

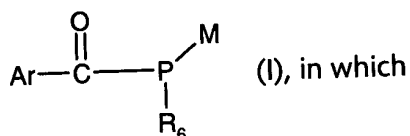
with the proviso that the acyl halide of the formula IV is not identical to the acyl halide of the formula IVa;

in the molar ratio of approximately 1:1; and,

(3) if compounds of the formula II, in which A is oxygen or sulfur are to be obtained, subsequent oxidation or sulfurization of the phosphine compounds.

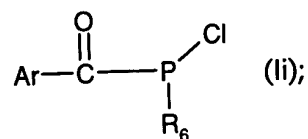
8. (original) A process for the preparation of compounds of the formula II according to claim 2, in which A is oxygen and x is 1, by

(1) reaction of a compound of the formula (I), according to claim 1

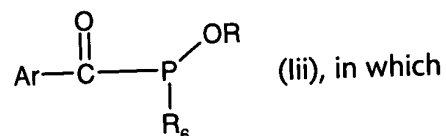


Ar, M and R<sub>6</sub> are as defined in claim 1,

with phosgene to give the corresponding phosphine chloride (li)

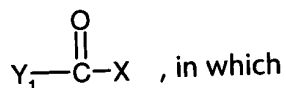


(2) subsequent reaction with an alcohol to give the compound of the formula (lii)



R is the radical of an alcohol, in particular C<sub>1</sub>-C<sub>12</sub>alkyl, C<sub>5</sub>-C<sub>8</sub>cycloalkyl or benzyl; and

(3) reaction of the resulting compound of the formula (lii) with an acyl halide



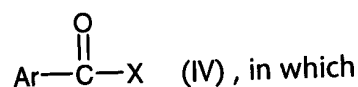
Y<sub>1</sub> is as defined in claim 2, and

X is Cl or Br,

to give the compound of the formula II but in which Ar and Y<sub>1</sub> are not necessarily different.

9. (original) A process for the preparation of compounds of the formula III

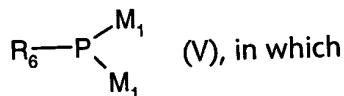
(1) by reaction of an acyl halide of the formula IV



Ar is as defined in claim 3, and

X is Cl or Br;

with a dimetalated organophosphine of the formula V

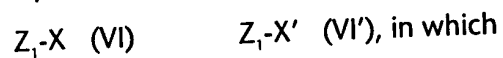


R<sub>6</sub> is as defined in claim 3; and

M<sub>1</sub> is Na, Li or K;

in the molar ratio of approximately 1:1;

(2) subsequent reaction of the product with a compound of the formula VI or VI'



$Z_1$  is as defined in claim 3; and

$X$  is as defined above; and

$X'$  is  $-N=C=A$ ,  $-N=C=N=Z_1$ ,  $-\overset{\text{O}}{\underset{\text{H}}{\text{C}}}-\text{CH}_2$  or  $-\text{CHO}$ ;

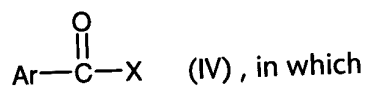
with the proviso that,  $Z_1$  is not identical to  $R_6$ ;

in the molar ratio of approximately 1:1; and, in the case where  $Z_1$  is not a group (v), (w) or  $C_1$ - $C_{12}$ alkylthio, and

(3) compounds of the formula III, in which A is oxygen or sulfur are to be obtained, subsequent oxidation or sulfurization of the resulting phosphine compounds.

10. (original) A process for the preparation of compounds of the formula III, according to claim 3,

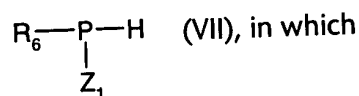
(1) by reaction of an acyl halide of the formula IV



$\text{Ar}$  is as defined in claim 1, and

$X$  is Cl or Br;

with an unsymmetrical phosphine of the formula VII



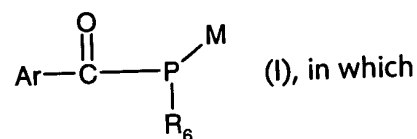
$R_6$  is as defined in claim 1, and

$Z_1$  is as defined in claim 3 with the proviso that  $R_6$  and  $Z_1$  are not identical; in the molar ratio of approximately 1:1, in the presence of a base or an organolithium compound, to give the corresponding acylphosphine; and

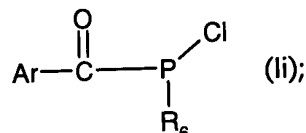
(2) subsequent oxidation or sulfurization of the thus obtained acylphosphine.

11. (original) A process for the preparation of compounds of the formula III according to claim 3, in which A is oxygen and x is 1, by

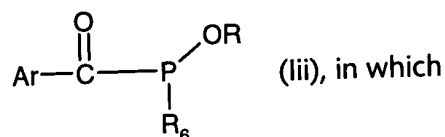
(1) reaction of the compound of the formula (I), according to claim 1



Ar, M and R<sub>6</sub> is as defined in claim 1,  
with phosgene to give the corresponding phosphine chloride (li)



(2) subsequent reaction with an alcohol to give the compound of the formula (lii)



R is the radical of an alcohol, in particular C<sub>1</sub>-C<sub>12</sub>alkyl, C<sub>5</sub>-C<sub>8</sub>cycloalkyl or benzyl; and  
(3) reaction of the resulting compound of the formula (lii) with an organoylhalide

Z<sub>1</sub>-X , in which

Z<sub>1</sub> is as defined in claim 3, but is not identical to R<sub>6</sub> from the formula (I) ist, and

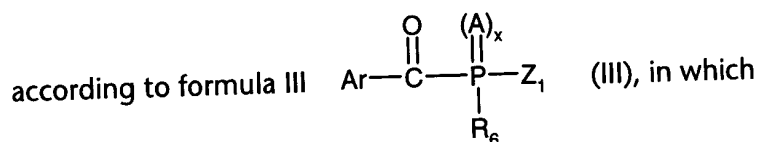
X is Cl or Br,

to give the compound of the formula III.

12. (previously amended) A photocurable composition comprising

(a) at least one ethylenically unsaturated photopolymerizable compound and

(b) at least one compound of the formula II according to claim 2 or at least one compound

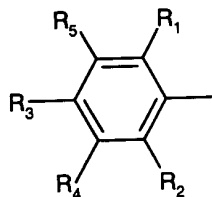


A is O or S;

x is 0 or 1;



Ar is a group



; or Ar is cyclopentyl, cyclohexyl, naphthyl, anthracyl,

biphenyl or an O-, S- or N-containing 5- or 6-membered heterocyclic ring, where the radicals cyclopentyl, cyclohexyl, naphthyl, anthracyl, biphenyl and 5- or 6-membered heterocyclic ring are unsubstituted or substituted by halogen, C<sub>1</sub>-C<sub>4</sub>alkyl and/or C<sub>1</sub>-C<sub>4</sub>alkoxy;

R<sub>1</sub> and R<sub>2</sub> independently of one another are C<sub>1</sub>-C<sub>20</sub>alkyl, OR<sub>11</sub>, CF<sub>3</sub> or halogen;

R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> independently of one another are hydrogen, C<sub>1</sub>-C<sub>20</sub>alkyl, OR<sub>11</sub> or halogen;

or in each case two of the radicals R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> together form C<sub>1</sub>-C<sub>20</sub>alkylene which can be interrupted by O, S or -NR<sub>14</sub>;

R<sub>6</sub> is C<sub>1</sub>-C<sub>24</sub>alkyl, unsubstituted or substituted by C<sub>5</sub>-C<sub>24</sub>cycloalkenyl, phenyl, CN, C(O)R<sub>11</sub>, C(O)OR<sub>11</sub>, C(O)N(R<sub>14</sub>)<sub>2</sub>, OC(O)R<sub>11</sub>, OC(O)OR<sub>11</sub>, N(R<sub>14</sub>)C(O)N(R<sub>14</sub>), OC(O)NR<sub>14</sub>, N(R<sub>14</sub>)C(O)OR<sub>11</sub>,

cycloalkyl, halogen, OR<sub>11</sub>, SR<sub>11</sub>, N(R<sub>12</sub>)(R<sub>13</sub>) or  $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$  ;

C<sub>2</sub>-C<sub>24</sub>alkyl which is interrupted once or more than once by nonconsecutive O, S or NR<sub>14</sub> and which is unsubstituted or substituted by phenyl, OR<sub>11</sub>, SR<sub>11</sub>, N(R<sub>12</sub>)(R<sub>13</sub>), CN, C(O)R<sub>11</sub>, C(O)OR<sub>11</sub>,

C(O)N(R<sub>14</sub>)<sub>2</sub> and/or  $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$  ;

C<sub>2</sub>-C<sub>24</sub>alkenyl which is uninterrupted or interrupted once or more than once by nonconsecutive O, S or NR<sub>14</sub> and which is unsubstituted or substituted by OR<sub>11</sub>, SR<sub>11</sub> or N(R<sub>12</sub>)(R<sub>13</sub>);

C<sub>5</sub>-C<sub>24</sub>cycloalkenyl which is uninterrupted or interrupted once or more than once by nonconsecutive O, S or NR<sub>14</sub> and which is unsubstituted or substituted by OR<sub>11</sub>, SR<sub>11</sub> or N(R<sub>12</sub>)(R<sub>13</sub>);

C<sub>7</sub>-C<sub>24</sub>arylalkyl which is unsubstituted or substituted on the aryl group by C<sub>1</sub>-C<sub>12</sub>alkyl, C<sub>1</sub>-C<sub>12</sub>alkoxy or halogen;

C<sub>4</sub>-C<sub>24</sub>cycloalkyl which is uninterrupted or interrupted once or more than once by O, S and/or NR<sub>14</sub> and which is unsubstituted or substituted by OR<sub>11</sub>, SR<sub>11</sub> or N(R<sub>12</sub>)(R<sub>13</sub>); or C<sub>8</sub>-C<sub>24</sub>arylcycloalkyl or C<sub>8</sub>-C<sub>24</sub>arylcycloalkenyl;

$R_{11}$  is H,  $C_1$ - $C_{20}$ alkyl,  $C_2$ - $C_{20}$ alkenyl,  $C_3$ - $C_8$ cycloalkyl, phenyl, benzyl or  $C_2$ - $C_{20}$ alkyl which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted by OH and/or SH;

$R_{12}$  and  $R_{13}$  independently of one another are hydrogen,  $C_1$ - $C_{20}$ alkyl,  $C_3$ - $C_8$ cycloalkyl, phenyl, benzyl or  $C_2$ - $C_{20}$ alkyl, which is interrupted once or more than once by O or S and which is unsubstituted or substituted by OH and/or SH; or  $R_{12}$  and  $R_{13}$  together are  $C_3$ - $C_5$ alkylene which is uninterrupted or interrupted by O, S or  $NR_{14}$ ;

$Z_1$  is  $C_1$ - $C_{24}$ alkyl, which is unsubstituted or substituted once or more than once by  $OR_{15}$ ,  $SR_{15}$ ,

$N(R_{16})(R_{17})$ , phenyl, halogen, CN,  $-N=C=A$ ,  $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$ ,  $\text{---}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{---}R_{18}$ ,  $\text{---}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{---}OR_{18}$

and/or  $\text{---}\overset{\text{A}_1}{\underset{\text{||}}{\text{C}}}\text{---}N(R_{18})_2$  or  $Z_1$  is  $C_2$ - $C_{24}$ alkyl which is interrupted once or more than once by O, S

or  $NR_{14}$  and which can be substituted by  $OR_{15}$ ,  $SR_{15}$ ,  $N(R_{16})(R_{17})$ , phenyl, halogen,  $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$ ,

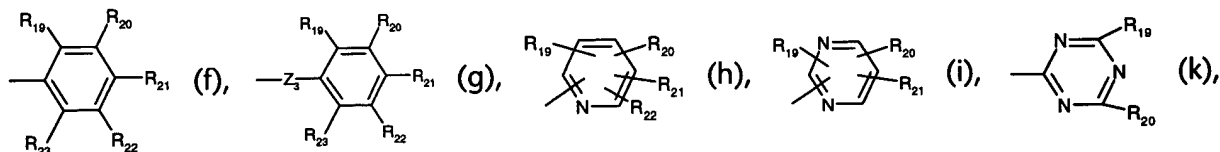
$\text{---}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{---}R_{18}$ ,  $\text{---}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{---}OR_{18}$  and/or  $\text{---}\overset{\text{A}_1}{\underset{\text{||}}{\text{C}}}\text{---}N(R_{18})_2$ ; or  $Z_1$  is  $C_1$ - $C_{24}$ alkoxy, which is substituted

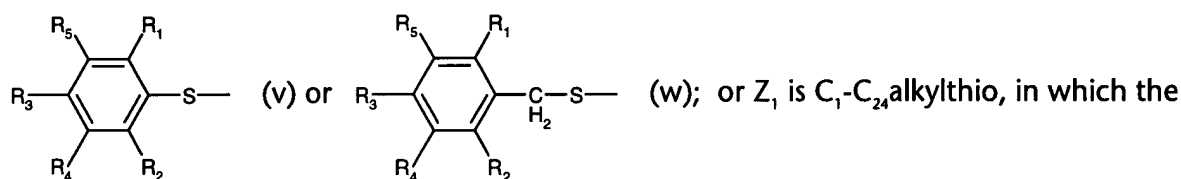
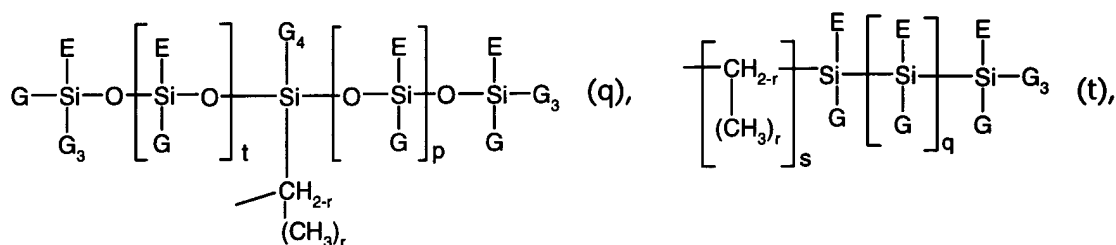
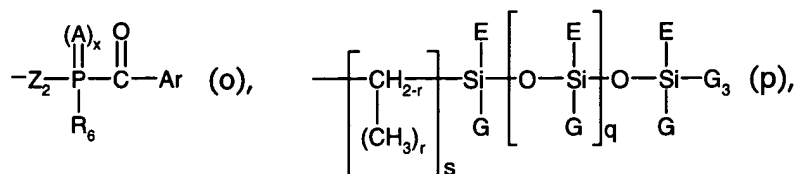
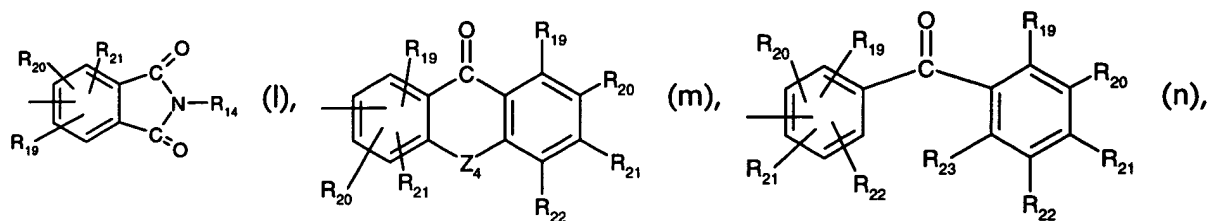
once or more than once by phenyl, CN,  $-N=C=A$ ,  $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$ ,  $\text{---}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{---}R_{18}$ ,  $\text{---}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{---}OR_{18}$

and/or  $\text{---}\overset{\text{A}_1}{\underset{\text{||}}{\text{C}}}\text{---}N(R_{18})_2$ ; or  $Z_1$  is  $\text{---}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{---}OR_{11}$ ,  $\text{---}\overset{\text{A}_1}{\underset{\text{||}}{\text{C}}}\text{---}N(R_{16})(R_{17})$ ,  $\text{---}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{---}OR_{11a}$  or

$\text{---}\overset{\text{A}_1}{\underset{\text{||}}{\text{C}}}\text{---}N(R_{18a})(R_{18b})$ ; or  $Z_1$  is unsubstituted  $C_3$ - $C_{24}$ cycloalkyl or  $C_3$ - $C_{24}$ cycloalkyl substituted by

$C_1$ - $C_{20}$ alkyl,  $OR_{11}$ ,  $CF_3$  or halogen; unsubstituted  $C_2$ - $C_{24}$ alkenyl or  $C_2$ - $C_{24}$ alkenyl substituted by  $C_6$ - $C_{12}$ aryl, CN,  $(CO)OR_{15}$  or  $(CO)N(R_{18})_2$ ; or  $Z_1$  is  $C_3$ - $C_{24}$ cycloalkenyl or is one of the radicals



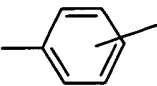
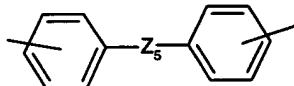


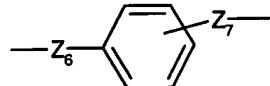
alkyl radical is uninterrupted or interrupted once or more than once by nonconsecutive O or S, and is unsubstituted or substituted by OR<sub>15</sub>, SR<sub>15</sub> and/or halogen; with the proviso that Z<sub>1</sub> and R<sub>6</sub> are not identical;

A<sub>1</sub> is O, S or NR<sub>18a</sub>;

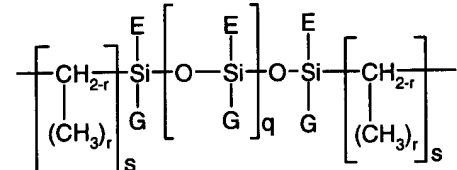
Z<sub>2</sub> is C<sub>1</sub>---C<sub>24</sub>alkylene; C<sub>2</sub>---C<sub>24</sub>alkylene interrupted once or more than once by O, S or NR<sub>14i</sub>; C<sub>2</sub>---C<sub>24</sub>alkenylene; C<sub>2</sub>---C<sub>24</sub>alkenylene interrupted once or more than once by O, S or NR<sub>14i</sub>; C<sub>3</sub>---C<sub>24</sub>cycloalkylene; C<sub>3</sub>---C<sub>24</sub>cycloalkylene interrupted once or more than once by O, S or NR<sub>14i</sub>; C<sub>3</sub>---C<sub>24</sub>cycloalkylene; C<sub>3</sub>---C<sub>24</sub>cycloalkenylene interrupted once or more than once by O, S or NR<sub>14i</sub>;

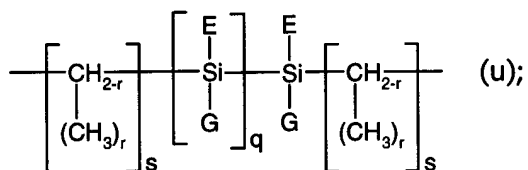
where the radicals  $C_1$ - $C_{24}$ alkylene,  $C_2$ - $C_{24}$ alkylene,  $C_2$ - $C_{24}$ alkenylene,  $C_3$ - $C_{24}$ cycloalkylene and  $C_3$ - $C_{24}$ cycloalkenylene are unsubstituted or are substituted by  $OR_{11}$ ,  $SR_{11}$ ,  $N(R_{12})(R_{13})$  and/or

halogen; or  $Z_2$  is one of the radicals , ,

or , where these radicals are unsubstituted or are substituted on the

aromatic by  $C_1$ - $C_{20}$ alkyl;  $C_2$ - $C_{20}$ alkyl which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted by OH and/or SH;  $OR_{11}$ ,  $SR_{11}$ ,  $N(R_{12})(R_{13})$ , phenyl, halogen,  $NO_2$ , CN,  $(CO)-OR_{11}$ ,  $(CO)-R_{11}$ ,  $(CO)-N(R_{12})(R_{13})$ ,  $SO_2R_{24}$ ,  $OSO_2R_{24}$ ,  $CF_3$  and/or  $CCl_3$ ;

C  
or  $Z_2$  is a group  (r) or



$Z_3$  is  $CH_2$ ,  $CH(OH)$ ,  $CH(CH_3)$  or  $C(CH_3)_2$ ;

$Z_4$  is S, O,  $CH_2$ , C=O,  $NR_{14}$  or a direct bond;

$Z_5$  is S, O,  $CH_2$ ,  $CHCH_3$ ,  $C(CH_3)_2$ ,  $C(CF_3)_2$ , SO,  $SO_2$ , CO;

$Z_6$  and  $Z_7$  independently of one another are  $CH_2$ ,  $CHCH_3$  or  $C(CH_3)_2$ ;

r is 0, 1 or 2;

s is a number from 1 to 12;

q is a number from 0 to 50;

t and p are each a number from 0 to 20;

E, G, G<sub>3</sub> and G<sub>4</sub> independently of one another are unsubstituted C<sub>1</sub>-C<sub>12</sub>alkyl or C<sub>1</sub>-C<sub>12</sub>alkyl substituted by halogen, or are unsubstituted phenyl or phenyl substituted by one or more C<sub>1</sub>-C<sub>4</sub>alkyl; or are C<sub>2</sub>-C<sub>12</sub>alkenyl;

R<sub>11a</sub> is C<sub>1</sub>-C<sub>20</sub>alkyl substituted once or more than once by OR<sub>15</sub> or  $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$ ; or is C<sub>2</sub>-C<sub>20</sub>alkyl which is interrupted once or more than once by nonconsecutive O atoms and is unsubstituted or substituted once or more than once by OR<sub>15</sub>, halogen or  $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$ ; or R<sub>11a</sub> is C<sub>2</sub>-C<sub>20</sub>alkenyl,

C<sub>3</sub>-C<sub>12</sub>alkynyl; or R<sub>11a</sub> is C<sub>3</sub>-C<sub>12</sub>cycloalkenyl which is substituted once or more than once by halogen, NO<sub>2</sub>, C<sub>1</sub>-C<sub>6</sub>alkyl, OR<sub>11</sub> or C(O)OR<sub>18</sub>; or C<sub>7</sub>-C<sub>16</sub>arylalkyl or C<sub>8</sub>-C<sub>16</sub>arylcycloalkyl;

R<sub>14</sub> is hydrogen, phenyl, C<sub>1</sub>-C<sub>12</sub>alkoxy, C<sub>1</sub>-C<sub>12</sub>alkyl or C<sub>2</sub>-C<sub>12</sub>alkyl which is interrupted once or more than once by O or S and which is unsubstituted or substituted by OH and/or SH;

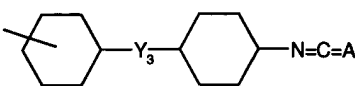
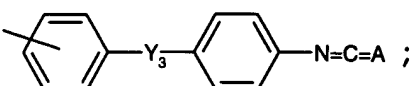
C  
R<sub>15</sub> has one of the meanings given for R<sub>11</sub> or is a radical  $\text{---}\overset{\text{A}}{\underset{\text{H}}{\text{C}}}\text{---R}_{18}$ ,  $\text{---}\overset{\text{A}}{\underset{\text{H}}{\text{C}}}\text{---OR}_{18}$  or  $\text{---}\overset{\text{A}_1}{\underset{\text{H}}{\text{C}}}\text{---N(R}_{18})_2$ ;

R<sub>16</sub> and R<sub>17</sub> independently of one another have one of the meanings given for R<sub>12</sub> or are a radical  $\text{---}\overset{\text{A}}{\underset{\text{H}}{\text{C}}}\text{---R}_{18}$ ,  $\text{---}\overset{\text{A}}{\underset{\text{H}}{\text{C}}}\text{---OR}_{18}$  or  $\text{---}\overset{\text{A}_1}{\underset{\text{H}}{\text{C}}}\text{---N(R}_{18})_2$ ;

R<sub>18</sub> is hydrogen, C<sub>1</sub>-C<sub>24</sub>alkyl, C<sub>2</sub>-C<sub>12</sub>alkenyl, C<sub>3</sub>-C<sub>8</sub>cycloalkyl, phenyl, benzyl; C<sub>2</sub>-C<sub>20</sub>alkyl which is interrupted once or more than once by O or S and which is unsubstituted or substituted by OH;

R<sub>18a</sub> and R<sub>18b</sub> independently of one another are hydrogen; C<sub>1</sub>-C<sub>20</sub>alkyl, which is substituted once or more than once by OR<sub>15</sub>, halogen, styryl, methylstyryl, -N=C=A or  $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$ ; or C<sub>2</sub>-C<sub>20</sub>alkyl, which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted once or more than once by OR<sub>15</sub>, halogen, styryl, methylstyryl or  $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$ ; or R<sub>18a</sub> and R<sub>18b</sub> are C<sub>2</sub>-C<sub>12</sub>alkenyl; C<sub>5</sub>-C<sub>12</sub>cycloalkyl, which is substituted by -N=C=A or -CH<sub>2</sub>-N=C=A and is additionally unsubstituted or substituted by one or more C<sub>1</sub>-C<sub>4</sub>alkyl; or R<sub>18a</sub>

and  $R_{18b}$  are  $C_6$ - $C_{12}$ aryl, unsubstituted or substituted once or more than once by halogen,  $NO_2$ ,  $C_1$ - $C_6$ alkyl,  $C_2$ - $C_4$ alkenyl,  $OR_{11}$ ,  $-N=C=A$ ,  $-CH_2-N=C=A$  or  $C(O)OR_{18}$ ; or  $R_{18a}$  and  $R_{18b}$  are  $C_7$ - $C_{16}$ arylalkyl; or  $R_{18a}$  and  $R_{18b}$  together are  $C_8$ - $C_{16}$ arylcyaloalkyl; or  $R_{18a}$  and  $R_{18b}$  independently of

one another are  or  ;

$Y_3$  is O, S, SO,  $SO_2$ ,  $CH_2$ ,  $C(CH_3)_2$ ,  $CHCH_3$ ,  $C(CF_3)_2$ , (CO), or a direct bond;

$R_{19}$ ,  $R_{20}$ ,  $R_{21}$ ,  $R_{22}$  and  $R_{23}$  independently of one another are hydrogen,  $C_1$ - $C_{20}$ alkyl;  $C_2$ - $C_{20}$ alkyl, which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted by OH and/or SH; or  $R_{19}$ ,  $R_{20}$ ,  $R_{21}$ ,  $R_{22}$  and  $R_{23}$  are  $OR_{11}$ ,  $SR_{11}$ ,  $N(R_{12})(R_{13})$ ,  $NO_2$ , CN,  $SO_2R_{24}$ ,  $OSO_2R_{24}$ ,  $CF_3$ ,  $CCl_3$ , halogen; or phenyl which is unsubstituted or substituted once or more than once by  $C_1$ - $C_4$ alkyl or  $C_1$ - $C_4$ alkoxy;

or in each case two of the radicals  $R_{19}$ ,  $R_{20}$ ,  $R_{21}$ ,  $R_{22}$  and  $R_{23}$  together form  $C_1$ - $C_{20}$ alkylene which is uninterrupted or interrupted by O, S or  $-NR_{14}$ ;

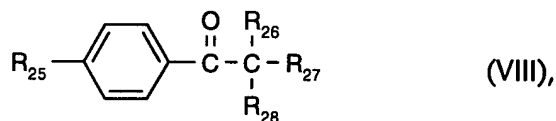
$R_{24}$  is  $C_1$ - $C_{12}$ alkyl, halogen-substituted  $C_1$ - $C_{12}$ alkyl, phenyl, or phenyl substituted by  $OR_{11}$  and/or  $SR_{11}$ ;

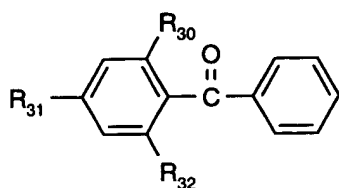
with the proviso that  $R_6$  and  $Z_1$  are not identical,

as photoinitiator.

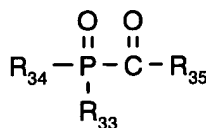
13. (original) A photocurable composition according to claim 12, comprising, in addition to components (a) and (b), further photoinitiators (c) and/or further additives (d).

14. (original) A photocurable composition as claimed in claim 13, comprising, as further photoinitiator (c), at least one compound of the formula VIII, IX, X, XI

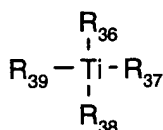




(IX),



(X),



(XI), in which

$R_{25}$  is hydrogen,  $C_1$ - $C_{18}$ alkyl,  $C_1$ - $C_{18}$ alkoxy,  $-OCH_2CH_2-OR_{29}$ , morpholino,  $SCH_3$ , a

group  $H_2C=C\begin{smallmatrix} CH_3 \\ | \end{smallmatrix}$  or a group  $G_1\left[CH_2-C\begin{smallmatrix} CH_3 \\ | \end{smallmatrix}\right]_nG_2$  ;

$n$  has a value from 2 to 10;

$G_1$  and  $G_2$  independently of one another are end groups of the polymeric unit, in particular hydrogen or  $CH_3$ ;

$R_{26}$  is hydroxyl,  $C_1$ - $C_{16}$ alkoxy, morpholino, dimethylamino or  $-O(CH_2CH_2O)_m-C_1-C_{16}$ alkyl;

$R_{27}$  and  $R_{28}$  independently of one another are hydrogen,  $C_1$ - $C_6$ alkyl, phenyl, benzyl,  $C_1$ - $C_{16}$ alkoxy or  $-O(CH_2CH_2O)_m-C_1-C_{16}$ alkyl, or  $R_{27}$  and  $R_{28}$  together with the carbon atom to which they are bonded form a cyclohexyl ring;

$m$  is a number from 1-20;

where  $R_{26}$ ,  $R_{27}$  and  $R_{28}$  are not all  $C_1$ - $C_{16}$ alkoxy or  $-O(CH_2CH_2O)_m-C_1-C_{16}$ alkyl at the same time, and

$R_{29}$  is hydrogen,  $\begin{smallmatrix} O \\ || \\ -C-CH=CH_2 \end{smallmatrix}$  or  $\begin{smallmatrix} O & CH_3 \\ || & | \\ -C-C=CH_2 \end{smallmatrix}$  ;

$R_{30}$  and  $R_{32}$  independently of one another are hydrogen or methyl;

$R_{31}$  is hydrogen, methyl or phenylthio, where the phenyl ring of the phenylthio radical is unsubstituted or substituted by  $C_1$ - $C_4$ alkyl in the 4-, 2-, 2,4- or 2,4,6-position;

$R_{33}$  and  $R_{34}$  independently of one another are  $C_1$ - $C_{20}$ alkyl, cyclohexyl, cyclopentyl, phenyl, naphthyl or biphenyl, where these radicals are unsubstituted or are substituted by halogen,  $C_1$ -

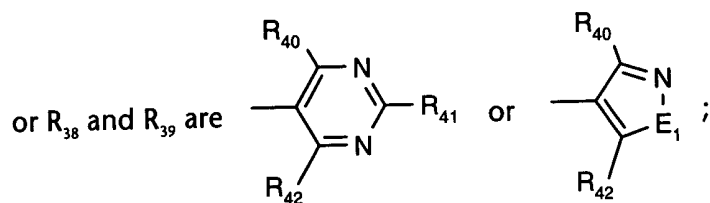
$C_{12}$ alkyl and/or  $C_1$ - $C_{12}$ alkoxy, or  $R_{33}$  is an S- or N-containing 5- or 6-membered heterocyclic ring,

or are  $\text{—}\overset{\text{O}}{\underset{\text{||}}{\text{C}}}\text{—}R_{35}$  ;

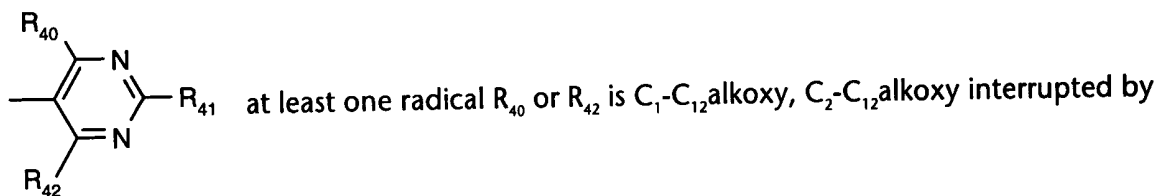
$R_{35}$  is cyclohexyl, cyclopentyl, phenyl, naphthyl or biphenyl, these radicals being unsubstituted or substituted by halogen,  $C_1$ - $C_4$ alkyl and/or  $C_1$ - $C_4$ alkoxy, or  $R_{35}$  is an S- or N-containing 5- or 6-membered heterocyclic ring;

$R_{36}$  and  $R_{37}$  independently of one another are unsubstituted cyclopentadienyl or cyclopentadienyl substituted once, twice or three times by  $C_1$ - $C_{18}$ alkyl,  $C_1$ - $C_{18}$ alkoxy, cyclopentyl, cyclohexyl or halogen; and

$R_{38}$  and  $R_{39}$  independently of one another are phenyl which is substituted in at least one of the two ortho positions relative to the titanium-carbon bond by fluorine atoms or  $\text{CF}_3$ , and which on the aromatic ring may contain, as further substituents, unsubstituted pyrrolinyl or pyrrolinyl substituted by one or two  $C_1$ - $C_{12}$ alkyl, di( $C_1$ - $C_{12}$ alkyl)aminomethyl, morpholinomethyl,  $C_2$ - $C_4$ alkenyl, methoxymethyl, ethoxymethyl, trimethylsilyl, formyl, methoxy or phenyl; or polyoxaalkyl,



$R_{40}$ ,  $R_{41}$  and  $R_{42}$  independently of one another are hydrogen, halogen,  $C_2$ - $C_{12}$ alkenyl,  $C_1$ - $C_{12}$ alkoxy,  $C_2$ - $C_{12}$ alkoxy interrupted by one to four O atoms, cyclohexyloxy, cyclopentyloxy, phenoxy, benzyloxy, unsubstituted phenyl or phenyl substituted by  $C_1$ - $C_4$ alkoxy, halogen, phenylthio or  $C_1$ - $C_4$ alkylthio; or biphenyl, where  $R_{40}$  and  $R_{42}$  are not both hydrogen at the same time and in the radical



one to four O atoms, cyclohexyloxy, cyclopentyloxy, phenoxy or benzyloxy;



$E_1$  is O, S or  $NR_{43}$ ; and

$R_{43}$  is  $C_1$ - $C_8$ alkyl, phenyl or cyclohexyl.

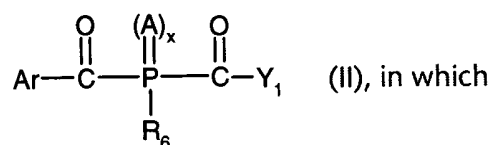
15. (original) A process for the photopolymerization of nonvolatile monomeric, oligomeric or polymeric compounds having at least one ethylenically unsaturated double bond, which comprises irradiating a composition according to claim 12 with light in the range from 200 to 600 nm.

C/ 16. (original) A process according to claim 15 for the preparation of pigmented and nonpigmented surface coatings, printing inks, screen printing inks, offset printing inks, flexographic printing inks, powder coatings, printing plates, adhesives, dental materials, optical waveguides, optical switches, colour testing systems, composite materials, gel coats, glass-fibre cable coatings, screen printing stencils, resist materials, colour filters, for the encapsulation of electrical and electronic components, for the preparation of magnetic recording materials, of three-dimensional objects by means of stereolithography, of photographic reproductions, image recording material, for holographic recordings, for the preparation of decolouring materials, <sup>or</sup> for the preparation of image recording materials using microcapsules.

17. (original) A coated substrate which has been coated on at least one surface with a composition according to claim 12.

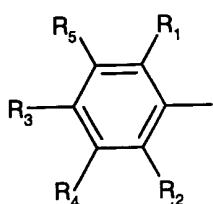
18. (original) A process for the photographic production of relief images in which a coated substrate according to claim 17 is subjected to imagewise exposure and then the unexposed portions are removed with a solvent.

19. (new) A process for the preparation of bisacylphosphine oxides or sulfides of formula II



A is O or S;

x is 0 or 1;

Ar is a group ; or Ar is cyclopentyl, cyclohexyl, naphthyl, anthracyl,

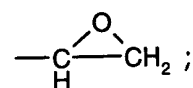
biphenyl or an O-, S- or N-containing 5- or 6-membered heterocyclic ring, where the radicals cyclopentyl, cyclohexyl, naphthyl, anthracyl, biphenyl and 5- or 6-membered heterocyclic ring are unsubstituted or substituted by halogen, C<sub>1</sub>-C<sub>4</sub>alkyl and/or C<sub>1</sub>-C<sub>4</sub>alkoxy;

R<sub>1</sub> and R<sub>2</sub> independently of one another are C<sub>1</sub>-C<sub>20</sub>alkyl, OR<sub>11</sub>, CF<sub>3</sub> or halogen;

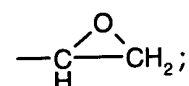
R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> independently of one another are hydrogen, C<sub>1</sub>-C<sub>20</sub>alkyl, OR<sub>11</sub> or halogen;

or in each case two of the radicals R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> together form C<sub>1</sub>-C<sub>20</sub>alkylene which can be interrupted by O, S or -NR<sub>14</sub>;

C1 R<sub>6</sub> is C<sub>1</sub>-C<sub>24</sub>alkyl, unsubstituted or substituted by C<sub>5</sub>-C<sub>24</sub>cycloalkenyl, phenyl, CN, C(O)R<sub>11</sub>, C(O)OR<sub>11</sub>, C(O)N(R<sub>14</sub>)<sub>2</sub>, OC(O)R<sub>11</sub>, OC(O)OR<sub>11</sub>, N(R<sub>14</sub>)C(O)N(R<sub>14</sub>), OC(O)NR<sub>14</sub>, N(R<sub>14</sub>)C(O)OR<sub>11</sub>,

cycloalkyl, halogen, OR<sub>11</sub>, SR<sub>11</sub>, N(R<sub>12</sub>)(R<sub>13</sub>) or ;

C<sub>2</sub>-C<sub>24</sub>alkyl which is interrupted once or more than once by nonconsecutive O, S or NR<sub>14</sub> and which is unsubstituted or substituted by phenyl, OR<sub>11</sub>, SR<sub>11</sub>, N(R<sub>12</sub>)(R<sub>13</sub>), CN, C(O)R<sub>11</sub>, C(O)OR<sub>11</sub>,

C(O)N(R<sub>14</sub>)<sub>2</sub> and/or .

C<sub>2</sub>-C<sub>24</sub>alkenyl which is uninterrupted or interrupted once or more than once by nonconsecutive O, S or NR<sub>14</sub> and which is unsubstituted or substituted by OR<sub>11</sub>, SR<sub>11</sub> or N(R<sub>12</sub>)(R<sub>13</sub>);

C<sub>5</sub>-C<sub>24</sub>cycloalkenyl which is uninterrupted or interrupted once or more than once by nonconsecutive O, S or NR<sub>14</sub> and which is unsubstituted or substituted by OR<sub>11</sub>, SR<sub>11</sub> or N(R<sub>12</sub>)(R<sub>13</sub>);

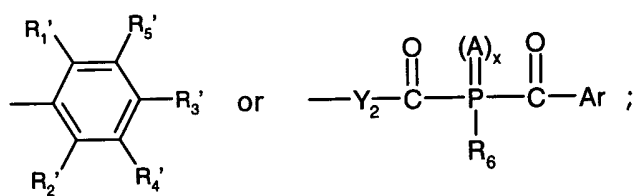
C<sub>7</sub>-C<sub>24</sub>arylalkyl which is unsubstituted or substituted on the aryl group by C<sub>1</sub>-C<sub>12</sub>alkyl, C<sub>1</sub>-C<sub>12</sub>alkoxy or halogen;

C<sub>4</sub>-C<sub>24</sub>cycloalkyl which is uninterrupted or interrupted once or more than once by O, S and/or NR<sub>14</sub> and which is unsubstituted or substituted by OR<sub>11</sub>, SR<sub>11</sub> or N(R<sub>12</sub>)(R<sub>13</sub>); or C<sub>8</sub>-C<sub>24</sub>aryl cycloalkyl or C<sub>8</sub>-C<sub>24</sub>aryl cycloalkenyl;

$R_{11}$  is H,  $C_1$ - $C_{20}$ alkyl,  $C_2$ - $C_{20}$ alkenyl,  $C_3$ - $C_8$ cycloalkyl, phenyl, benzyl or  $C_2$ - $C_{20}$ alkyl which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted by OH and/or SH;

$R_{12}$  and  $R_{13}$  independently of one another are hydrogen,  $C_1$ - $C_{20}$ alkyl,  $C_3$ - $C_8$ cycloalkyl, phenyl, benzyl or  $C_2$ - $C_{20}$ alkyl which is interrupted once or more than once by O or S and which is unsubstituted or substituted by OH and/or SH; or  $R_{12}$  and  $R_{13}$  together are  $C_3$ - $C_5$ alkylene which is uninterrupted or interrupted by O, S or  $NR_{14}$ ;

$Y_1$  is  $C_1$ - $C_{18}$ alkyl which is unsubstituted or substituted by one or more phenyl;  $C_1$ - $C_{18}$ halogenoalkyl;  $C_2$ - $C_{18}$ alkyl which is interrupted once or more than once by O or S and which can be substituted by OH and/or SH; unsubstituted  $C_3$ - $C_{18}$ cycloalkyl or  $C_3$ - $C_{18}$ cycloalkyl substituted by  $C_1$ - $C_{20}$ alkyl,  $OR_{11}$ ,  $CF_3$  or halogen;  $C_2$ - $C_{18}$ alkenyl; or  $Y_1$  is  $OR_{11}$ ,  $N(R_{12})(R_{13})$  or one of the radicals



or  $Y_1$  is cyclopentyl, cyclohexyl, naphthyl, anthracyl, biphenyl or an O-, S- or N-containing 5- or 6-membered heterocyclic ring, where the radicals cyclopentyl, cyclohexyl, naphthyl, anthracyl, biphenyl and 5- or 6-membered heterocyclic ring are unsubstituted or substituted by halogen,  $C_1$ - $C_4$ alkyl and/or  $C_1$ - $C_4$ alkoxy;

$Y_2$  is a direct bond; unsubstituted or phenyl-substituted  $C_1$ - $C_{18}$ alkylene; unsubstituted  $C_4$ - $C_{18}$ -cycloalkylene or  $C_4$ - $C_{18}$ cycloalkylene substituted by  $C_1$ - $C_{12}$ alkyl,  $OR_{11}$ , halogen and/or phenyl; unsubstituted  $C_5$ - $C_{18}$ cycloalkenylene or  $C_5$ - $C_{18}$ cycloalkenylene substituted by  $C_1$ - $C_{12}$ alkyl,  $OR_{11}$ , halogen and/or phenyl; unsubstituted phenylene or phenylene substituted one to four times by  $C_1$ - $C_{12}$ alkyl,  $OR_{11}$ , halogen,  $-(CO)OR_{14}$ ,  $-(CO)N(R_{12})(R_{13})$  and/or phenyl;

or  $Y_2$  is a radical or , where these radicals are

unsubstituted or are substituted one to four times on one or both aromatic ring(s) by  $C_1$ - $C_{12}$ alkyl,  $OR_{11}$ , halogen and/or phenyl;

$Y_3$  is O, S, SO,  $SO_2$ ,  $CH_2$ ,  $C(CH_3)_2$ ,  $CHCH_3$ ,  $C(CF_3)_2$ , CO or a direct bond;

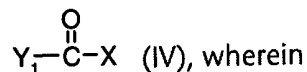
$R_{14}$  is hydrogen, phenyl,  $C_1$ - $C_{12}$ alkyl or  $C_2$ - $C_{12}$ alkyl which is interrupted once or more than once by O or S and which can be substituted by OH and/or SH;

$R_1'$  and  $R_2'$  independently of one another have the same meanings as given for  $R_1$  and  $R_2$ ; and  $R_3'$ ,  $R_4'$  and  $R_5'$  independently of one another have the same meanings as given for  $R_3$ ,  $R_4$  and  $R_5$ ;

or in each case two of the radicals  $R_1'$ ,  $R_2'$ ,  $R_3'$ ,  $R_4'$  and  $R_5'$  together form  $C_1$ - $C_{20}$ alkylene which may be interrupted by O, S or  $-NR_{14}$ ;

with the proviso that  $Y_1$  is not identical to Ar;

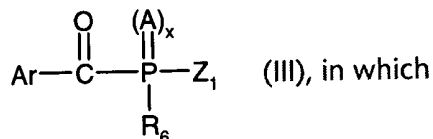
by reacting an alkylacylphosphine compound of formula I according to claim 1 with an acid halide of the formula (IV)



X is Cl or Br;

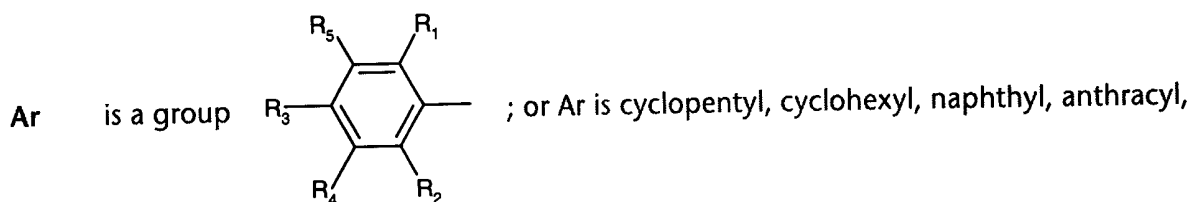
in a molar ratio of about 1:1, optionally in a solvent, at a reaction temperature from about  $-60^\circ\text{C}$  to about  $+120^\circ\text{C}$  to give a phosphine compound of formula II, wherein x is 0, and optionally, subsequent oxidation or sulfurization of the resulting phosphine compound to give the corresponding oxide or sulfide compound wherein x is 1 and A is O or S.

20. (new) A process for the preparation of monoacylphosphine oxides or sulfides of formula III



A is O or S;

x is 0 or 1;



biphenyl or an O-, S- or N-containing 5- or 6-membered heterocyclic ring, where the radicals

cyclopentyl, cyclohexyl, naphthyl, anthracyl, biphenyl and 5- or 6-membered heterocyclic ring are unsubstituted or substituted by halogen, C<sub>1</sub>-C<sub>4</sub>alkyl and/or C<sub>1</sub>-C<sub>4</sub>alkoxy;

R<sub>1</sub> and R<sub>2</sub> independently of one another are C<sub>1</sub>-C<sub>20</sub>alkyl, OR<sub>11</sub>, CF<sub>3</sub> or halogen;

R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> independently of one another are hydrogen, C<sub>1</sub>-C<sub>20</sub>alkyl, OR<sub>11</sub> or halogen;

or in each case two of the radicals R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> together form C<sub>1</sub>-C<sub>20</sub>alkylene which can be interrupted by O, S or NR<sub>14</sub>;

R<sub>6</sub> is C<sub>1</sub>-C<sub>24</sub>alkyl, unsubstituted or substituted by C<sub>5</sub>-C<sub>24</sub>cycloalkenyl, phenyl, CN, C(O)R<sub>11</sub>, C(O)OR<sub>11</sub>, C(O)N(R<sub>14</sub>)<sub>2</sub>, OC(O)R<sub>11</sub>, OC(O)OR<sub>11</sub>, N(R<sub>14</sub>)C(O)N(R<sub>14</sub>), OC(O)NR<sub>14</sub>, N(R<sub>14</sub>)C(O)OR<sub>11</sub>, cycloalkyl, halogen, OR<sub>11</sub>, SR<sub>11</sub>, N(R<sub>12</sub>)(R<sub>13</sub>) or  $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$  ;

C<sub>2</sub>-C<sub>24</sub>alkyl which is interrupted once or more than once by nonconsecutive O, S or NR<sub>14</sub> and which is unsubstituted or substituted by phenyl, OR<sub>11</sub>, SR<sub>11</sub>, N(R<sub>12</sub>)(R<sub>13</sub>), CN, C(O)R<sub>11</sub>, C(O)OR<sub>11</sub>,

C(O)N(R<sub>14</sub>)<sub>2</sub> and/or  $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$  ;

C<sub>2</sub>-C<sub>24</sub>alkenyl which is uninterrupted or interrupted once or more than once by nonconsecutive O, S or NR<sub>14</sub> and which is unsubstituted or substituted by OR<sub>11</sub>, SR<sub>11</sub> or N(R<sub>12</sub>)(R<sub>13</sub>);

C<sub>5</sub>-C<sub>24</sub>cycloalkenyl which is uninterrupted or interrupted once or more than once by nonconsecutive O, S or NR<sub>14</sub> and which is unsubstituted or substituted by OR<sub>11</sub>, SR<sub>11</sub> or N(R<sub>12</sub>)(R<sub>13</sub>);

C<sub>7</sub>-C<sub>24</sub>arylalkyl which is unsubstituted or substituted on the aryl group by C<sub>1</sub>-C<sub>12</sub>alkyl, C<sub>1</sub>-C<sub>12</sub>alkoxy or halogen;

C<sub>4</sub>-C<sub>24</sub>cycloalkyl which is uninterrupted or interrupted once or more than once by O, S and/or NR<sub>14</sub> and which is unsubstituted or substituted by OR<sub>11</sub>, SR<sub>11</sub> or N(R<sub>12</sub>)(R<sub>13</sub>); or C<sub>8</sub>-C<sub>24</sub>arylalkyl or C<sub>8</sub>-C<sub>24</sub>arylalkenyl;

R<sub>11</sub> is H, C<sub>1</sub>-C<sub>20</sub>alkyl, C<sub>2</sub>-C<sub>20</sub>alkenyl, C<sub>3</sub>-C<sub>8</sub>cycloalkyl, phenyl, benzyl or C<sub>2</sub>-C<sub>20</sub>alkyl which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted by OH and/or SH;

R<sub>12</sub> and R<sub>13</sub> independently of one another are hydrogen, C<sub>1</sub>-C<sub>20</sub>alkyl, C<sub>3</sub>-C<sub>8</sub>cycloalkyl, phenyl, benzyl or C<sub>2</sub>-C<sub>20</sub>alkyl, which is interrupted once or more than once by O or S and which is unsubstituted or substituted by OH and/or SH; or R<sub>12</sub> and R<sub>13</sub> together are C<sub>3</sub>-C<sub>3</sub>alkylene which is uninterrupted or interrupted by O, S or NR<sub>14</sub>;

$Z_1$  is  $C_1$ - $C_{24}$ alkyl, which is unsubstituted or substituted once or more than once by  $OR_{15}$ ,  $SR_{15}$ ,

$N(R_{16})(R_{17})$ , phenyl, halogen,  $CN$ ,  $-N=C=A$ ,  $-\overset{\overset{O}{\parallel}}{C}-CH_2$ ,  $-\overset{\overset{A}{\parallel}}{C}-R_{18}$ ,  $-\overset{\overset{A}{\parallel}}{C}-OR_{18}$

and/or  $-\overset{\overset{A_1}{\parallel}}{C}-N(R_{18})_2$  or  $Z_1$  is  $C_2$ - $C_{24}$ alkyl which is interrupted once or more than once by  $O$ ,  $S$

or  $NR_{14}$  and which can be substituted by  $OR_{15}$ ,  $SR_{15}$ ,  $N(R_{16})(R_{17})$ , phenyl, halogen,  $-\overset{\overset{O}{\parallel}}{C}-CH_2$ ,

$-\overset{\overset{A}{\parallel}}{C}-R_{18}$ ,  $-\overset{\overset{A}{\parallel}}{C}-OR_{18}$  and/or  $-\overset{\overset{A_1}{\parallel}}{C}-N(R_{18})_2$ ; or  $Z_1$  is  $C_1$ - $C_{24}$ alkoxy, which is substituted

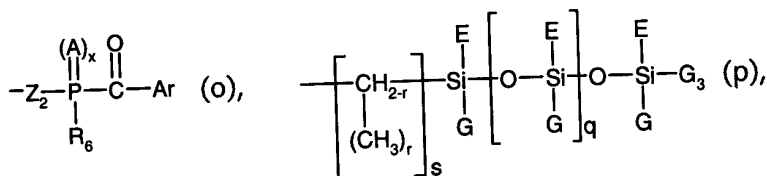
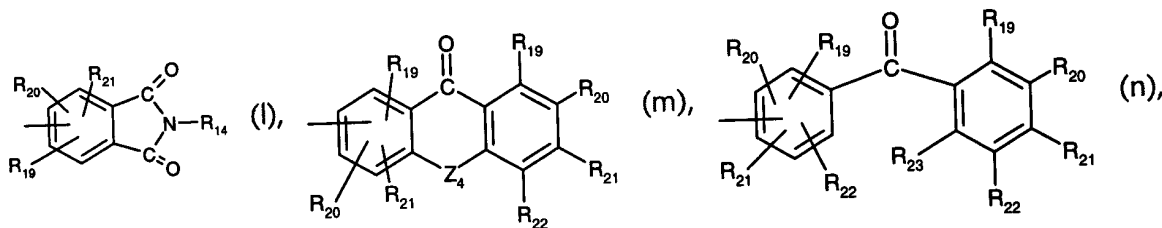
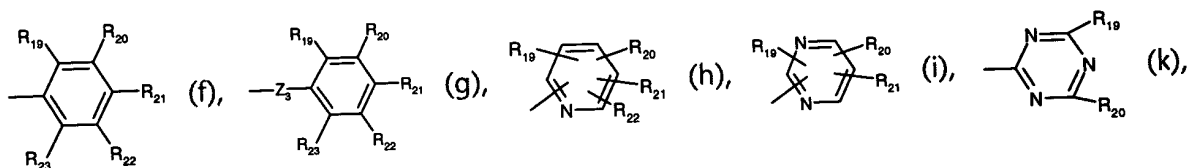
once or more than once by phenyl,  $CN$ ,  $-N=C=A$ ,  $-\overset{\overset{O}{\parallel}}{C}-CH_2$ ,  $-\overset{\overset{A}{\parallel}}{C}-R_{18}$ ,  $-\overset{\overset{A}{\parallel}}{C}-OR_{18}$

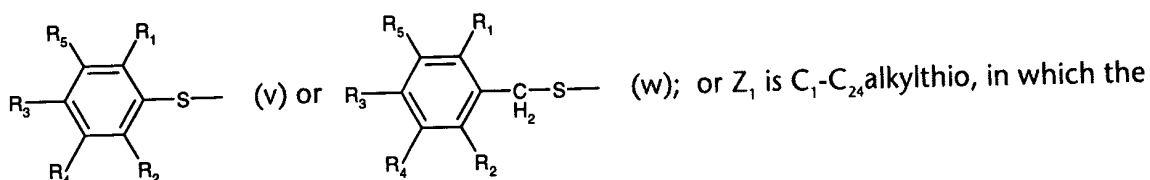
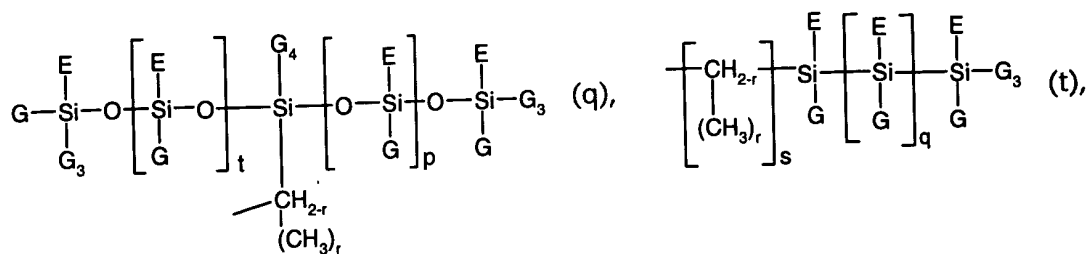
and/or  $-\overset{\overset{A_1}{\parallel}}{C}-N(R_{18})_2$ ; or  $Z_1$  is  $-\overset{\overset{A}{\parallel}}{C}-OR_{11}$ ,  $-\overset{\overset{A_1}{\parallel}}{C}-N(R_{16})(R_{17})$ ,  $-\overset{\overset{A}{\parallel}}{C}-OR_{11a}$  or

$-\overset{\overset{A_1}{\parallel}}{C}-N(R_{18a})(R_{18b})$ ; or  $Z_1$  is unsubstituted  $C_3$ - $C_{24}$ cycloalkyl or  $C_3$ - $C_{24}$ cycloalkyl substituted by

$C_1$ - $C_{20}$ alkyl,  $OR_{11}$ ,  $CF_3$  or halogen; unsubstituted  $C_2$ - $C_{24}$ alkenyl or  $C_2$ - $C_{24}$ alkenyl substituted by

$C_6$ - $C_{12}$ aryl,  $CN$ ,  $(CO)OR_{15}$  or  $(CO)N(R_{18})_2$ ; or  $Z_1$  is  $C_3$ - $C_{24}$ cycloalkenyl or is one of the radicals

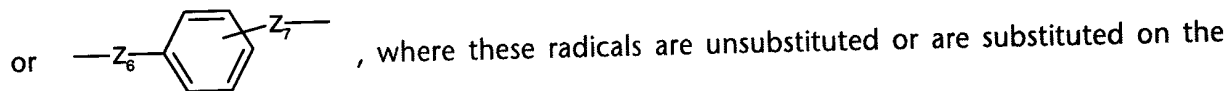
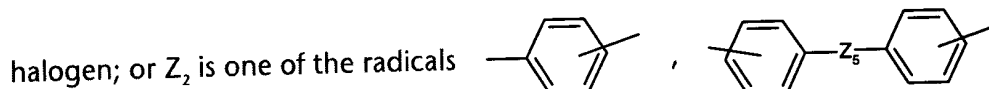




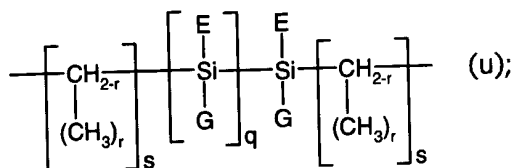
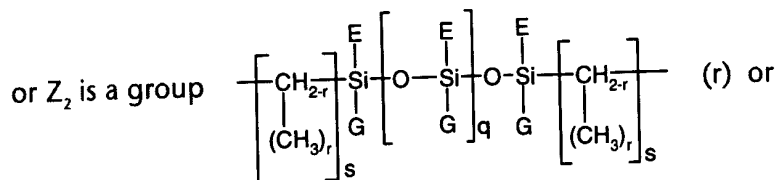
alkyl radical is uninterrupted or interrupted once or more than once by nonconsecutive O or S, and is unsubstituted or substituted by OR<sub>15</sub>, SR<sub>15</sub> and/or halogen; with the proviso that Z<sub>1</sub> and R<sub>6</sub> are not identical;

A<sub>1</sub> is O, S or NR<sub>18a</sub>;

Z<sub>2</sub> is C<sub>1</sub>-C<sub>24</sub> alkylene; C<sub>2</sub>-C<sub>24</sub> alkylene interrupted once or more than once by O, S or NR<sub>14i</sub>; C<sub>2</sub>-C<sub>24</sub> alkenylene; C<sub>2</sub>-C<sub>24</sub> alkenylene interrupted once or more than once by O, S or NR<sub>14i</sub>; C<sub>3</sub>-C<sub>24</sub> cycloalkylene; C<sub>3</sub>-C<sub>24</sub> cycloalkylene interrupted once or more than once by O, S or NR<sub>14i</sub>; C<sub>3</sub>-C<sub>24</sub> cycloalkylene; C<sub>3</sub>-C<sub>24</sub> cycloalkylene interrupted once or more than once by O, S or NR<sub>14i</sub>; where the radicals C<sub>1</sub>-C<sub>24</sub> alkylene, C<sub>2</sub>-C<sub>24</sub> alkylene, C<sub>2</sub>-C<sub>24</sub> alkenylene, C<sub>3</sub>-C<sub>24</sub> cycloalkylene and C<sub>3</sub>-C<sub>24</sub> cycloalkylene are unsubstituted or are substituted by OR<sub>11</sub>, SR<sub>11</sub>, N(R<sub>12</sub>)(R<sub>13</sub>) and/or



aromatic by C<sub>1</sub>-C<sub>20</sub> alkyl; C<sub>2</sub>-C<sub>20</sub> alkyl which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted by OH and/or SH; OR<sub>11</sub>, SR<sub>11</sub>, N(R<sub>12</sub>)(R<sub>13</sub>), phenyl, halogen, NO<sub>2</sub>, CN, (CO)-OR<sub>11</sub>, (CO)-R<sub>11</sub>, (CO)-N(R<sub>12</sub>)(R<sub>13</sub>), SO<sub>2</sub>R<sub>24</sub>, OSO<sub>2</sub>R<sub>24</sub>, CF<sub>3</sub> and/or CCl<sub>3</sub>;



$Z_3$  is  $\text{CH}_2$ ,  $\text{CH}(\text{OH})$ ,  $\text{CH}(\text{CH}_3)$  or  $\text{C}(\text{CH}_3)_2$ ;

$Z_4$  is  $\text{S}$ ,  $\text{O}$ ,  $\text{CH}_2$ ,  $\text{C}=\text{O}$ ,  $\text{NR}_{14}$  or a direct bond;

$Z_5$  is  $\text{S}$ ,  $\text{O}$ ,  $\text{CH}_2$ ,  $\text{CHCH}_3$ ,  $\text{C}(\text{CH}_3)_2$ ,  $\text{C}(\text{CF}_3)_2$ ,  $\text{SO}$ ,  $\text{SO}_2$ ,  $\text{CO}$ ;

$Z_6$  and  $Z_7$  independently of one another are  $\text{CH}_2$ ,  $\text{CHCH}_3$  or  $\text{C}(\text{CH}_3)_2$ ;

$r$  is 0, 1 or 2;

$s$  is a number from 1 to 12;

$q$  is a number from 0 to 50;

$t$  and  $p$  are each a number from 0 to 20;

$\text{E}$ ,  $\text{G}$ ,  $\text{G}_3$  and  $\text{G}_4$  independently of one another are unsubstituted  $\text{C}_1$ - $\text{C}_{12}$ alkyl or  $\text{C}_1$ - $\text{C}_{12}$ alkyl substituted by halogen, or are unsubstituted phenyl or phenyl substituted by one or more  $\text{C}_1$ - $\text{C}_4$ alkyl; or are  $\text{C}_2$ - $\text{C}_{12}$ alkenyl;

$\text{R}_{11a}$  is  $\text{C}_1$ - $\text{C}_{20}$ alkyl substituted once or more than once by  $\text{OR}_{15}$  or  $\begin{array}{c} \text{O} \\ | \\ -\text{C}-\text{CH}_2 \\ | \\ \text{H} \end{array}$ ; or is  $\text{C}_2$ - $\text{C}_{20}$ alkyl

which is interrupted once or more than once by nonconsecutive O atoms and is unsubstituted

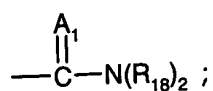
or substituted once or more than once by  $\text{OR}_{15}$ , halogen or  $\begin{array}{c} \text{O} \\ | \\ -\text{C}-\text{CH}_2 \\ | \\ \text{H} \end{array}$ ; or  $\text{R}_{11a}$  is  $\text{C}_2$ - $\text{C}_{20}$ alkenyl,

$\text{C}_3$ - $\text{C}_{12}$ alkynyl; or  $\text{R}_{11a}$  is  $\text{C}_3$ - $\text{C}_{12}$ cycloalkenyl which is substituted once or more than once by halogen,  $\text{NO}_2$ ,  $\text{C}_1$ - $\text{C}_6$ alkyl,  $\text{OR}_{11}$  or  $\text{C}(\text{O})\text{OR}_{18}$ ; or  $\text{C}_7$ - $\text{C}_{16}$ arylalkyl or  $\text{C}_8$ - $\text{C}_{16}$ aryl cycloalkyl;

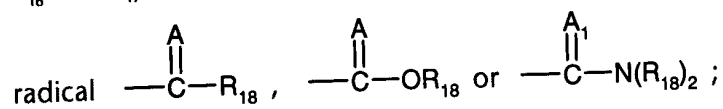
$\text{R}_{14}$  is hydrogen, phenyl,  $\text{C}_1$ - $\text{C}_{12}$ alkoxy,  $\text{C}_1$ - $\text{C}_{12}$ alkyl or  $\text{C}_2$ - $\text{C}_{12}$ alkyl which is interrupted once or more than once by O or S and which is unsubstituted or substituted by OH and/or SH;



$R_{15}$  has one of the meanings given for  $R_{11}$  or is a radical  $\text{—}\overset{\overset{\text{A}}{\parallel}}{\text{C}}\text{—}R_{18}$ ,  $\text{—}\overset{\overset{\text{A}}{\parallel}}{\text{C}}\text{—OR}_{18}$  or



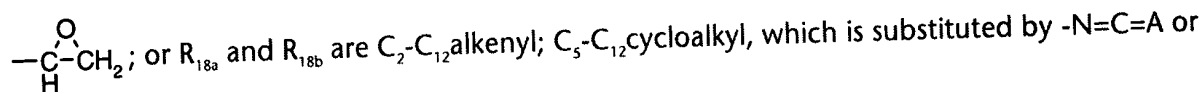
$R_{16}$  and  $R_{17}$  independently of one another have one of the meanings given for  $R_{12}$  or are a



$R_{18}$  is hydrogen,  $C_1$ - $C_{24}$ alkyl,  $C_2$ - $C_{12}$ alkenyl,  $C_3$ - $C_8$ cycloalkyl, phenyl, benzyl;  $C_2$ - $C_{20}$ alkyl which is interrupted once or more than once by O or S and which is unsubstituted or substituted by OH;

$R_{18a}$  and  $R_{18b}$  independently of one another are hydrogen;  $C_1$ - $C_{20}$ alkyl, which is substituted once or more than once by  $\text{OR}_{15}$ , halogen, styryl, methylstyryl,  $\text{—N=C=A}$  or  $\text{—}\overset{\overset{\text{O}}{\parallel}}{\text{C}}\text{—CH}_2$ ; or  $C_2$ - $C_{20}$ alkyl,

which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted once or more than once by  $\text{OR}_{15}$ , halogen, styryl, methylstyryl or

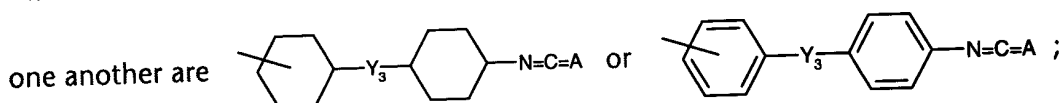


$\text{—CH}_2\text{—N=C=A}$  and is additionally unsubstituted or substituted by one or more  $C_1$ - $C_4$ alkyl; or  $R_{18a}$

and  $R_{18b}$  are  $C_6$ - $C_{12}$ aryl, unsubstituted or substituted once or more than once by halogen,  $\text{NO}_2$ ,

$C_1$ - $C_6$ alkyl,  $C_2$ - $C_4$ alkenyl,  $\text{OR}_{11}$ ,  $\text{—N=C=A}$ ,  $\text{—CH}_2\text{—N=C=A}$  or  $\text{C(O)OR}_{18}$ ; or  $R_{18a}$  and  $R_{18b}$  are  $C_7$ -

$C_{16}$ arylalkyl; or  $R_{18a}$  and  $R_{18b}$  together are  $C_8$ - $C_{16}$ arylalkyl; or  $R_{18a}$  and  $R_{18b}$  independently of



$Y_3$  is O, S, SO,  $\text{SO}_2$ ,  $\text{CH}_2$ ,  $\text{C(CH}_3)_2$ ,  $\text{CHCH}_3$ ,  $\text{C(CF}_3)_2$ , (CO), or a direct bond;

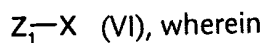
$R_{19}$ ,  $R_{20}$ ,  $R_{21}$ ,  $R_{22}$  and  $R_{23}$  independently of one another are hydrogen,  $C_1$ - $C_{20}$ alkyl;  $C_2$ - $C_{20}$ alkyl, which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted by OH and/or SH; or  $R_{19}$ ,  $R_{20}$ ,  $R_{21}$ ,  $R_{22}$  and  $R_{23}$  are  $\text{OR}_{11}$ ,  $\text{SR}_{11}$ ,  $\text{N(R}_{12})\text{(R}_{13})$ ,  $\text{NO}_2$ , CN,  $\text{SO}_2\text{R}_{24}$ ,  $\text{OSO}_2\text{R}_{24}$ ,  $\text{CF}_3$ ,  $\text{CCl}_3$ , halogen; or phenyl which is unsubstituted or substituted once or more than once by  $C_1$ - $C_4$ alkyl or  $C_1$ - $C_4$ alkoxy;

or in each case two of the radicals  $R_{19}$ ,  $R_{20}$ ,  $R_{21}$ ,  $R_{22}$  and  $R_{23}$  together form  $C_1-C_{20}$  alkylene which is uninterrupted or interrupted by O, S or  $-NR_{14}$ ;

$R_{24}$  is  $C_1-C_{12}$  alkyl, halogen-substituted  $C_1-C_{12}$  alkyl, phenyl, or phenyl substituted by  $OR_{11}$  and/or  $SR_{11}$ ;

with the proviso that  $R_6$  and  $Z_1$  are not identical;

by reacting an alkylacylphosphine compound of formula I according to claim 1 with a halide of the formula (VI)



X is Cl or Br;

in a molar ratio of about 1:1, optionally in a solvent, at a reaction temperature from about  $-60^\circ\text{C}$  to about  $+120^\circ\text{C}$  to give a phosphine compound of formula III wherein x is 0, and optionally, subsequent oxidation or sulfurization of the resulting phosphine compound to give the corresponding oxide or sulfide wherein x is 1 and A is O or S.